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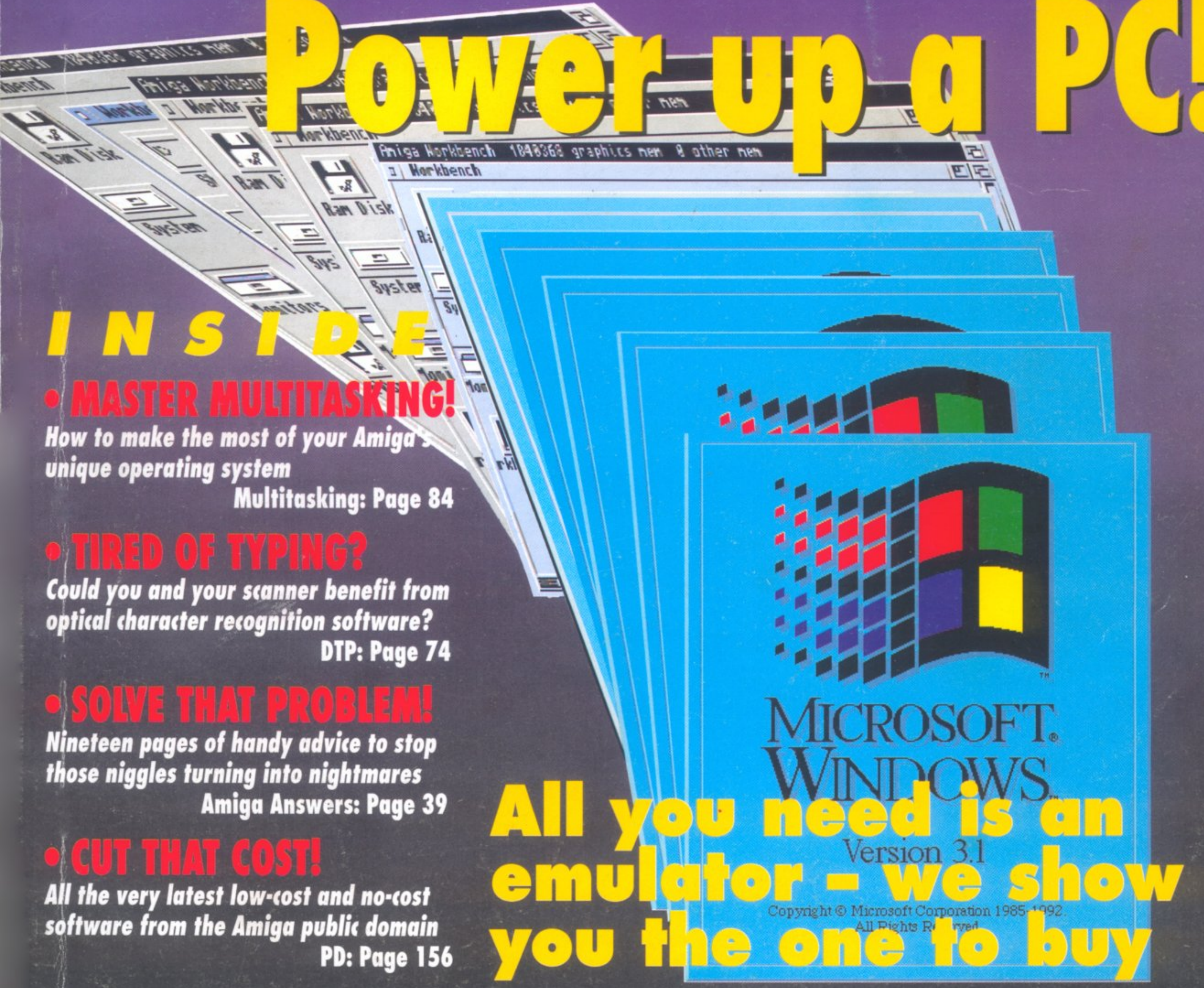
AMIGA SHOPPER

From the makers of Amiga Format

ISSUE 19 • NOVEMBER 1992 • £1.50

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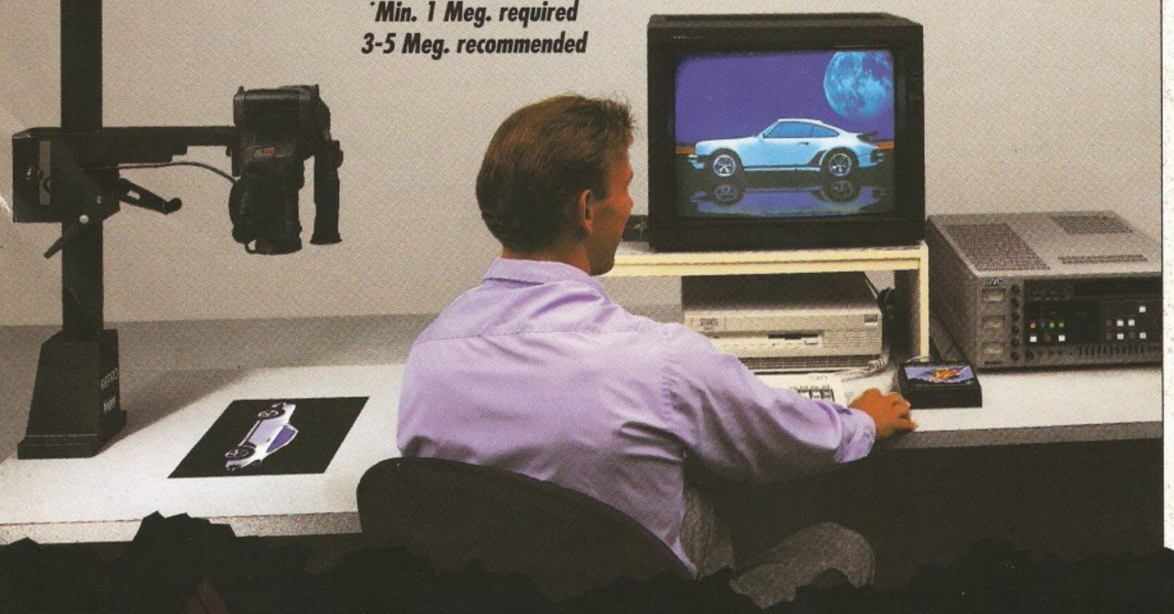
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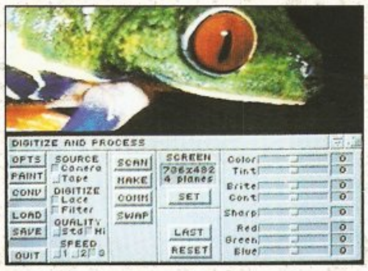
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WELCOME

This month we've decided to have a long look at the current state of the Amiga range and judge not only its potential, but also the threat from the PC and consoles markets squeezing it from both sides.

So, besides a big round-up of PC emulators and a look at how console graphics compare to those of the Amiga, there are also the results of a two-hour discussion the *Amiga Answers* panel had recently. What surprised me about the debate was the amount of criticism levelled at the Amiga – and this from supposedly dedicated fanatics. It just goes to show that if you care enough about something it usually ends up bearing the brunt of a lot of flak. But imagine what colour the air would have been if we'd just concentrated on the Atari ST!

And while we're on the subject, big things are happening in the ST world. There's a new 68030-based machine, the Falcon, with a very impressive spec at an even more impressive price of £399, all set for launch. Well, Atari had to do something pretty serious didn't it, having lost the 16-bit war abysmally? But if the next battle on the cards is a 32-bit war, Commodore had better get a move on.



Which is presumably why it has decided to drop the A2200 it only announced last month! Unbelievable! Still, the A4000 has finally made an appearance at *The World Of Commodore Show* in America – and it certainly looks promising (see page 7 for details). It suggests that a mid-range machine of some sort will soon be making an appearance.

Meanwhile, the best thing to do is make the most of what you've got – and that's where we come in.

Enjoy the ish!

Andy Stoner

Editor

AMIGA SHOPPER AT A GLANCE GUIDE

To help you find what you want quickly and easily, this is a cross-referenced list of all the products and subjects covered in this month's *Amiga Shopper*. The subjects covered in Amiga Answers are detailed on page 39; the many PD programs covered on page 156 are listed there. The page numbers given are for the first page of the article in which the product is mentioned.

Are there any products or subjects you'd like us to take a look at? Well, just drop a line to:

Amiga Shopper,
30, Monmouth Street,
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PUBLIC DOMAIN WORLD

MORSE CODE MAESTRO

There are thousands of Amiga programs which are available for little more than the price of a disk. And many more which allow you to try the software free before you buy. Each month in Public Domain World we examine the best of these programs and explain how to get hold of them.

This month we focus on a Morse code tutor, a new operating system and a disk to help you draw up your Last Will and Testament!

Public Domain World or

Where there's a will...

as we call it this month, starts on page 156

AMIGA ANSWERS

17 PAGES DEVOTED EXCLUSIVELY TO ANSWERING YOUR QUESTIONS

Every month in Amiga Answers our panel of experts answer more genuine reader questions than any other Amiga magazine. Whether they are beginners' queries or esoteric puzzlers – we tackle them all in clear and concise terms. Amiga Answers takes the frustration out of Amiga computing.

We answer questions every month on Workbench ● The CLI ● Comms ● Programming ● DTP ● Video ● Business software and more

THE ANSWERS START ON PAGE 41

FOR A FULL LIST OF CONTENTS, TURN THE PAGE

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INSIDE THIS ISSUE

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So how about winning another year's free subscription then chaps? - this time it's all about Guy Fawkes, seeing as how it's nearly bonfire night. Okay, answer this - where did poor old Guy's head end up after he'd been hung, drawn and quartered? You got it? Then just send the terribly grisly details to: 'Pity he didn't succeed', Amiga Shopper, 30, Monmouth St, Bath, BA1 2BW. First out the bag wins 12 free issues . Oh, and last ish's winner was : ta da da....Nobody... as yet, cos that Dagmar question was a real bast!

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KXP2123 24pin Colour	269
Epson LX400 9pin	135
Epson LQ570 24pin	265

Prices include VAT cable & paper

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for A1500

52Mb Hard Disk	£265
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GVP ram £25 per 1Mb

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CBM A2286 286 for A1500	£269
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WORRY OVER WANG'S FUTURE

Wang, the newly-appointed service and support organisation for Commodore UK, has filed for Chapter 11 in the United States.

Filing for Chapter 11 amounts to a declaration on the part of the company that it is in financial trouble. It has caused concern throughout the Amiga community. A spokesman for Wang has stated that the UK subsidiary handling Commodore's support commitments is unaffected by the action of its American parent. Commodore UK's managing director Kelly Sumner emphasised that Amiga owners have no cause for concern. "I'm completely confident with the situation, particularly the at-home support for the Amiga 600," he said.

SCANNER UPDATE

Pandaal Marketing has released version 3 of its hand scanner package.

The new software supplied with the DaataScan Professional GS offers a grey scale editor, colour palette control, drawing tools, variable zoom, a multi-screen layout and the facility to add text to scans. It's now possible to resize, stretch, flip and crop images. Smaller images may also be merged together to create A4 documents.

Scans may be touched up with the software's range of drawing tools, including freehand, line, polygon and curve, all in variable pen sizes. Editing is further enhanced by the inclusion of a cut and paste facility.

An upgrade to the software is available for £20 via mail order. Alternatively, the new package can be bought complete with scanner hardware for the price of £149.95, or £89.95 mail order direct from City Beat on ☎ 0234 327422.

PHILIPS MONITOR PRICE DROP

As part of its autumn promotion, Philips has reduced the price of its popular stereo colour CM8833/II monitor by £30 to £199.99.

The new price includes a one year's on-site maintenance warranty.

As a further incentive to buyers, Gremlin Graphics' *Lotus Turbo Challenge II* game is being bundled with the monitor from now until Christmas.

Buyers of the monitor are eligible to enter Philips' competition, whereby they stand to win a Ferrari Testarossa remote control car or even a VIP trip to the Silverstone Grand Prix.

Turn to the back page to see how you can win yourself a Philips monitor in our competition. Philips ☎ 081 689 4444.

The Advanced Graphics Architecture chip set arrives ***PLUS*** *AmigaDOS release 3*

A4000 born in the USA

Commodore has launched its latest Amiga at the *World Of Commodore Show* in Pasadena.

Crowds were wowed by the stunning displays produced by the high-powered multi-media workstation, the first Amiga to make use of Commodore's latest graphics chips known as the Advanced Graphics Architecture chip set. The machine's central processor is Motorola's 32-bit 68040, clocked at 25MHz, putting it firmly at the top of the Amiga heirarchy. Memory on the standard configuration is 2Mb of Chip (or graphics) RAM and 4Mb of Fast RAM. A 120Mb IDE hard disk is also included, as is a high density floppy drive which can be used to read PC disks. Disappointingly, the A4000's sound capabilities offer no improvement over those of a standard Amiga.

RIGHT CONNECTIONS

The A4000's external interfaces are much the same as on standard Amigas: keyboard, two mouse ports, a serial port, a parallel port, a video socket and stereo audio sockets. Internally the machine has three PC AT slots for accepting PC compatible cards, a 24-bit video slot and four Zorro III slots. Zorro III is the latest Commodore standard for plug-in cards, as used on the A3000. It is compatible with cards using the earlier Zorro II standard found in the A2000, but offers significant speed and memory advantages when used with Zorro III cards.

The most exciting aspect of the new machine, the Advanced Graphics Architecture chip set provides the computer with a palette of 16.7 million colours, up to 256,000 of which can be displayed on-screen at any one time. Resolutions are user-definable, ranging from 320x200 to 1280x400 pixels. Higher resolutions are possible with the A4000's hardware video overscan.

GRAPHIC PROOF

A 256 colour VGA screen, as used by IBM PCs, can now be emulated with ease. Screen modes with a greater number of colours operate in a 'super HAM' mode, but with much greater fidelity and clarity than the Amiga's standard HAM mode due to the increased colour resolution. Because of advanced CMOS technology and the chip set's full 32-bit architecture, it performs at something like four times the speed of the older ECS. Sprites are also improved, with a maximum width now of 64 pixels.

Because of the AGA's 32-bit architecture, it will not be made available for A500s or A2000s.

The new hardware is catered for by a new version of the operating system: AmigaDOS Release 3. As well as providing full support for the new graphics modes, Release 3 includes a PostScript printer driver and *CrossDOS*, a program enabling the machine to use PC disks. Support for foreign languages is also provided. The advantages of Release 3, excepting those handling the AGA chip set, will be available for earlier Amigas as Workbench 2.1.

Commodore UK's Kelly Sumner, when asked about the US launch, said: "I agree there is a product called the A4000. It's not due just yet – we'll keep you informed." *Amiga Shopper* believes it is due to be launched in the UK by mid-October. It sells for $3699 in the USA, and is expected to cost slightly over £2000 in the UK.

No doubt the A4000 is the first in a line of Amigas to make use of the AGA chip set. It would be madness for Commodore to spend money on developing the technology exclusively for the A4000, which is likely to be a small market machine. Yet Kelly Sumner told *Amiga Shopper* that Commodore has decided not to market the A2200 announced in last month's issue. No reason for the decision was given, although the company is still believed to be intending to release a mid-range Amiga in the near future.



The much-talked about A4000 is finally a reality. Hopes are high that its advanced graphics hardware will appear in cheaper machines

MORE TO COME?

This will be an Amiga with limited expansion potential, probably based on the Motorola 68020 processor and sporting the Advanced Graphics Architecture chip set. With the release of Atari's Falcon, the need is greater than ever for Commodore to release an enhanced Amiga at a reasonable price. Speaking of the Falcon, Sumner said, "I don't think it will succeed." If Commodore can release more machines like the A4000, he may be right.

INDUSTRY REACTIONS...

"The graphics are essential. PC owners have had 256 colours for a long time. This puts the Amiga back on top. It proves that Commodore is supporting the Amiga. We can assume that there will be other, cheaper machines to ensure the Amiga's future." – ***Toby Simpson, lead programmer for Millennium***

"The A4000's success depends on Commodore's promotional campaigns, and it has proved its considerable skill in this area with the A500 and A600. The success of any new hardware will also depend upon its support by third party developers. Having discussed the A4000 with GVP, I can reveal that it will be developing for it. In fact it has already designed one of its new products to be compatible with the A4000." – ***Andy Leaning, Silica Systems***

"The lack of a SCSI interface and decent quality sound are serious omissions which may well kill the machine. I think the head of the design team should be sacked. He is someone who knows nothing about the Amiga, who thought it was a PC. But the AGA chip set is fantastic, it really is the business." – ***Jolyon Ralph, CDTV developer for Almathera Systems***

"Although stopping short of full 24-bit colour, the new graphics spec should please video users – though I wonder whether the A4000 will be able to play animations in all those new colours" – ***Gary Whiteley, videographer and journalist***

Amigas bundled for Christmas

The latest A600 bundles for the run up to Christmas have been announced by Commodore.

Bundling software with Amigas has been Commodore's preferred strategy for selling machines for some years now. The latest move involves two separate packs, one for the standard A600 and one for the A600 with hard disk.

Aimed at the younger potential buyer, *The Wild, The Weird & The Wicked* pack will sell for £349.99. It includes Electronic Arts' *DPaint III*, Ocean's *Push-Over*, System 3's *Putty* and MicroProse's *Grand Prix*.

The A600 with a 20Mb hard disk will be sold as part of the *Epic/Language Lab* bundle for £499.99. This includes *DPaint III*, Domark's *Trivial Pursuit* and *Amiga Text* word processor, Ocean's *Epic*, Millennium's *Rome* and System 3's *Myth*.

Stand-alone A600s will still be available in limited quantities. Commenting on the recent price change, Kelly Sumner said that the machine's rate of sale had more than quadrupled during the first month of the drop. An even greater increase is expected as Christmas approaches and a TV advertising campaign begins. Attractive point-of-sale units are being placed in Commodore stockists, including Comet. A welcome move is the employment of a team of demonstrators to travel across the country, showing people the virtues of CDTV and inviting them to try the machines for themselves. To help cope with the demand, Commodore now has a factory producing A600s



Something for everyone in the A600 bundles

Sub-$250 '030 accelerator at American show

The *World Of Commodore Show* in Pasadena was the scene of many exciting product launches. Here's our stop-press round-up of the highlights – a full report will appear in next month's issue.

● CSA showed its Derringer accelerator. The 25MHz 68030 processor gives A500s and A2000s the same performance as an A3000 for only $249.95. It has space on board for a maths co-processor and 8Mb of RAM.

● Commodore announced the imminent arrival of PCMCIA adaptors for the A2000 and A3000, giving the machines access to any credit card-based hardware or software that becomes available for the A600.

● Commodore confirmed that there will in time be an Amiga laptop.

● Commodore will have a SCSI II card available for the A4000 by Christmas. SCSI II is a much improved interface for connecting hard disks, tape streamers and the like to computers.

● INOVAtronics demonstrated version 2 of *CanDo*, the multimedia authoring system. It features a better manual and script-bookmarking, whereby users can return to marked scripts with one or two keystrokes.

● Black Belt Systems demonstrated the improved morphing features of its image processing package *Imagemaster*. On an A3000, *Imagemaster* will morph a broadcast-sized image some 20% faster than a Silicon Graphics workstation.


Amazing morphing from Black Belt's *Imagemaster* package

● A 24-bit graphics board and digital video editing system were demonstrated by Digital Micronics. Vivid 24 has a maximum resolution of 2048x2048 pixels with 16.7 million colours and an 8-bit alpha channel. Its 16Mb of video memory, 8Mb of program memory, Texas Instruments graphics processor and four maths co-processors enable it to calculate and render 100,000 shaded polygons per second. The Digital EditMaster can record and compress video at 25 frames per second direct to hard disk using J-PEG compression technology. Frames can then be edited before being sent to an NTSC, PAL or SVHS recorder or monitor.

● Opal Technology's OpalVision 24-bit graphics board was strutting its stuff. With a range of promised add-ons, the board looks set to give NewTek's Video Toaster a run for its money. And it's PAL compatible! ***Watch out for a full review in next month's issue.***

Commodore's 386 PC emulator

Commodore's 386 PC Bridgeboard will be available by the time you read this.

Priced at around £250, the board will fit in the Amiga 1500 and larger models. It comes with an Intel 386SX processor clocked at 25MHz and 2Mb of RAM available for use by both the PC and the Amiga. A version is also planned for the A600 which will sell at a slightly lower price.

Top of the range 486 PC emulation from Vortex

Vortex has announced a 486 PC emulator for the A1500/A2000/A3000 range of Amigas.

The Intel 486 chip is used in state-of-the-art PCs, and is roughly equivalent to a 68040 accelerator. The Vortex emulator enables Amiga owners to keep up with the very best of PCs.

The Golden Gate 486 SLC has a 486SX processor clocked at 25MHz, complete with on-chip cache. It has a full 32-bit data bus and comes with 2Mb of 60 nano second RAM. An on-board IDE hard disk interface is included, as is a co-processor slot. An optional floppy disk controller is available. The emulator will sell for around £850. Expect a review soon. Vortex ☎ 01049 7131 597214.

High quality audio for the Amiga

SunRize Industries' AD516 digital audio card has been launched.

The card provides eight tracks of 16-bit audio – the first to do so for any computer. It comes with an SMPTE time code reader to enable the user to synchronise audio with video tape. Real time digital effects such as flanging, chorus and echo are provided by a digital signal processor.

The card samples at up to 48KHz, with 64 times over-sampling. Samples can be recorded to and played back from hard disk. Supplied with the hardware is version 2 of the *Studio 16* package first sold with SunRize's 12-bit AD1012 card. The software provides VU and LED meters, multi-track mixing, eight track playback with simultaneous two track record, full editing facilities and Fast Fourier Transform effects. An ARexx port is also provided for external control.

The AD516, including software, will cost in the region of £1000. It is distributed in the UK by HB Marketing ☎ 0753 686000. Owners of the AD1012 can upgrade by contacting SunRize Industries direct on ☎ 0101 408 374 4962.

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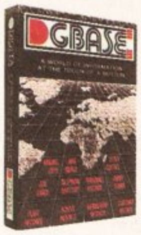
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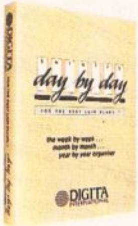
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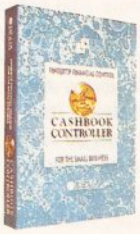


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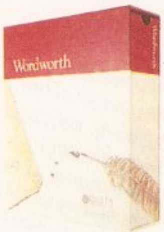


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Future of computing to be

Earls Court is to play host to the most ambitious computing and electronic entertainment show this country has seen in years

The UK's biggest computer show for years is all set for November 5. *The Future Entertainment Show* will cater for all home computer and console users, and incorporates *The World Of Commodore Show*.

To accomodate the expected 100,000 visitors, the huge number of exhibitors and some of the large and exuberant displays, the show will be taking place in both Earls Court 1 and 2 in London.

THE FUTURE

It will be the perfect opportunity to witness the future of home entertainment, pick up the latest in hardware and software, and meet the people behind your favourite mags, including *Amiga Shopper*.

Naturally there'll be plenty of hardware and software launches to see as well as tried and trusted packages for sale at unbeatable prices. Without doubt you'll have the chance to meet the people responsible for the leading magazines for the Amiga. But what makes the show something out of the ordinary is the range of 'extra-curricular' activities – the games arcades, competitions, fairground rides, the huge video wall. There'll also be the finals to the National Computer Games Championships to be televised on ITV's forthcoming computer programme *Bad Influence*. £20,000 in prize money is up for grabs, courtesy of Future Publishing.

Visitors to last year's *Amiga Format* sponsored *World Of Commodore Show* will be reassured to know that all of its elements will be present at the *Future Entertainment Show*, including the manufacturer of the Amiga itself. They may also remember the fairground ride set up by Ocean. Be assured that there will be similarly ambitious crowd-pullers, including the original Aston Martin sports car as used by James Bond.

ENTERTAINMENT

There'll also be plenty of computer games to have a look at, if that's your bag. Both Nintendo and Sega have booked stands, so you can have a look at their consoles and how your opinions compare with those of Toby Simpson, the Amiga developer who assesses the console threat to the Amiga on page 34.

The show runs from Thursday November 5 to Sunday November 8. It is open from 9.30am to 5.00pm on Thursday to Saturday; 9.30am to 4.00pm on Sunday. Tickets are £7 for adults and £5 for children under 14. Of course, it makes sense to avoid the queues by booking your tickets in advance. You can do this, and save £1.05 per ticket into the bargain, by calling the credit card hotline on ☎ 051 356 5085.

Now, just to whet your appetite, here's a preview of some of the more interesting things to be seen at the show...

...STOP PRESS... STOP PRESS...
American manufacturers GVP and Progressive Peripherals & Software have just confirmed their attendance.

AND WHO'LL BE THERE?

COMMODORE
Stands 1300 & 3250

Commodore will be taking two stands, one in the more serious Computing and Retail section, and one in the Entertainment section.

Many will have their first chance to see the A570 CD-ROM drive, along with a fantastic new range of CD titles that Commodore has helped develop.

The biggest pull will be Commodore's latest baby, the A4000. The full details of it are on page 7, but it has to be seen to be believed. And who knows – by November 5 Commodore may well have more new Amigas to show us...

CITIZEN EUROPE
Stand 3750

The new Swift 2 range will be on public display for the first time.

Also on show will be the 120D+, the Swift 9, the ProJet and the PN48, the world's smallest A4 printer.

AUDIO VISUAL RESEARCH
Stand 3800

Audio Visual Research will be showing VideoMaster, an all-in-one video and sound digitising package. With it users can record quarter screen monochrome pictures at up to 25 frames per seocnd. A sound sampler is also included as part of the hardware, so short films can easily be made. The company will also be demonstrating its low-cost Clarity 16 sampler, which will sample in 16-bit stereo.

BITCON DEVICES
Stand 4610

Bitcon will be showing a PC emulator for the A600, as well as its brand new high density twin floppy drive which will use not only Amiga but also PC disks when used in conjunction with the emulator.

DIGITA INTERNATIONAL
Stand 4730

Version 2 of *Wordworth* will make its debut. Enhancements to the word processor include columns, indexing, contents table, hot links, end nots, improved mail merge and file support, and improved search and replace and sorting.

HB MARKETING
Stand 4070

HB Marketing is one of the UK's biggest distributors of serious software for the Amiga. As well as just about any sort of program you can think of, the company will be selling the incredible Epson GT6000 A4 colour scanner.

NEW DIMENSIONS
Stand 4005

On display will be version 2 of TechnoSound Turbo, with new facilities including direct to disk sampling.

PHILIPS ELECTRONICS UK
Stand 1950

This will be your chance to compare Philips' CD-I machine with Commodore's CDTV. See the latest CD-I titles and judge for yourself which format offers the best in compact disc entertainment.

FUTURE PUBLISHING

Obviously you wouldn't come to *The Future Entertainment Show* without a look at the Future Publishing stand. Here you'll have the opportunity to talk to the *Amiga Shopper* team and tell us what you think is right about the magazine. We're always open to suggestions, so if you have any ideas for features or aspects of the Amiga you'd like to see covered, drop in and have a word with us. We'll also be more than happy to give advice or help with any technical queries.

You'll also get the chance to meet the people responsible for our sister magazines *Amiga Format* and *Amiga Power*, as well as the rest of the Future Leisure stable, catering for PC, ST, Nintendo and Sega users.

Pop by and say hello!

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revealed at Earls Court

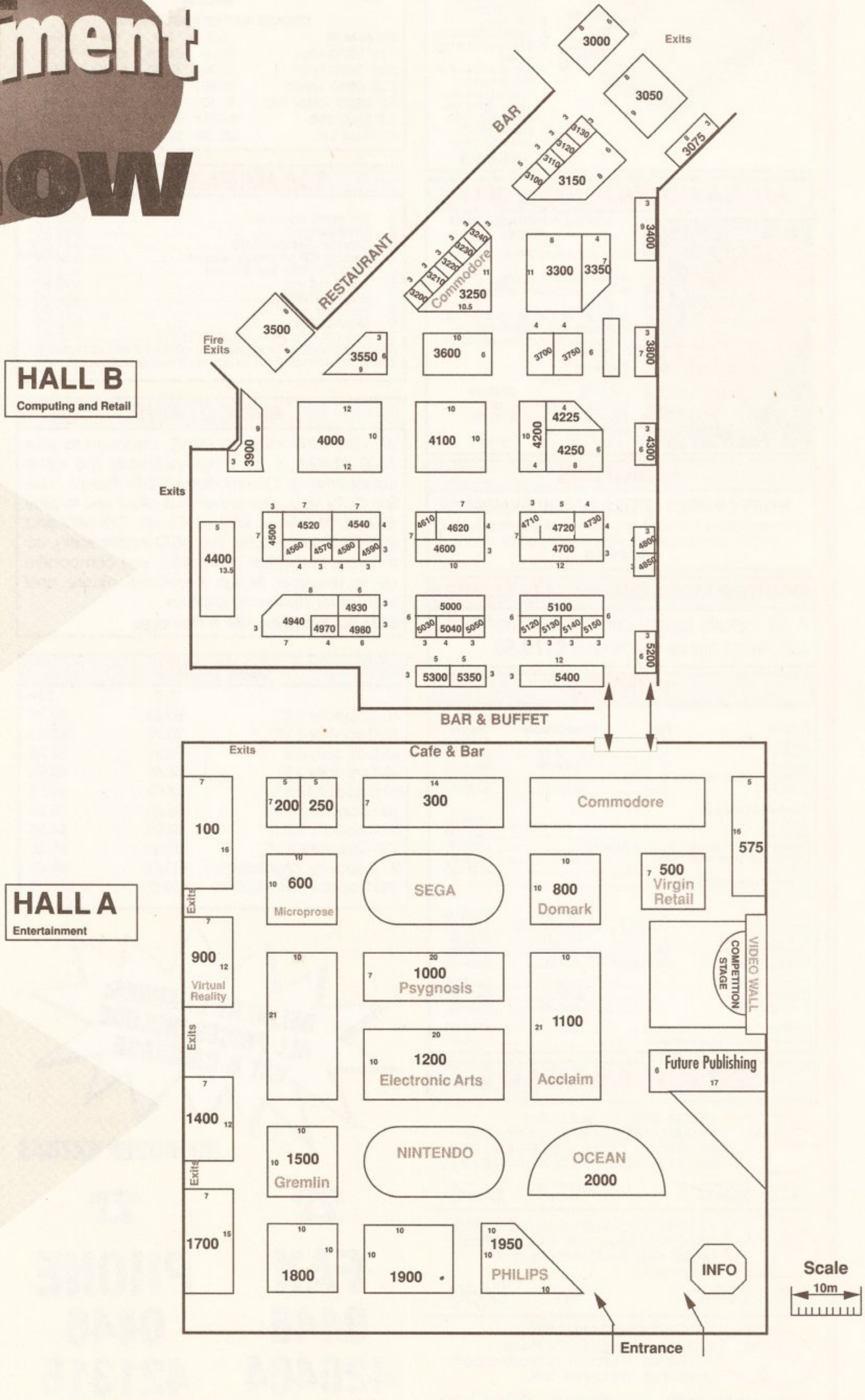
The Future Entertainment Show

FUTURE ENTERTAINMENT SHOW
Thursday November 5 - Sunday November 8

OPEN FROM
9.30am - 5.00pm
Thurs - Sat
9.30am - 4.00pm
Sun

TICKETS:
£7 adults
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Talking SHOP

Welcome to the Amiga world's liveliest letters pages! – the place where you get the chance to speak your mind. So join your host, the editor, Andy Storer for some more no-holds barred bantering. And remember, all you have to do to be included is send your missive to: 'Talking Shop', *Amiga Shopper*, 30, Monmouth St, Bath BA1 2BW. So get to it!...

DIAMOND PCs

Have you seen the recent Diamond Computers ad? It's bad enough with that CD-I joke, but what about the previous page? Why not get yourself a real computer? Why not indeed buy an Amstrad 386sx?

Somehow I don't think so. Although I own a B2000HD, I also use top-end PCs and UNIX systems all day at work, so I can safely state without bias that PCs are crap!

Just for the record, here are a few things that my computer experience has led me to notice...

My trusty Amiga has software that PC owners can only dream of, and even with its paltry 7MHz processor, can easily give a 486 running *Windows 3.1* a run for its money.

The old chestnut – software. Games – nothing else comes close (perhaps a MegaDrive). Business software – fair enough, most businesses use PCs, and their associated software *but* most decent Amiga packages can import PC standard formats, and in general they are many times superior to the PC packages. With an emulator, you can even run the PC software itself. I'd like to see an Amiga emulator on a PC!

Last year I was producing some reports on a Mac, and in order to work at home, borrowed a friend's AMAX. Surprise, Surprise, it was actually faster than the genuine Mac!

The only computer better than an Amiga I have used is a Sparc-based X-terminal, but with all the upgrades available (eg Super-Denise, 68040s, etc) and the rumours of the new Amigas, even these are coming under threat.

Well, that's enough slagging off for now but with all these stupid "my computer's better than yours" arguments going around, I had to get it off my chest. If anyone can come up with a decent pro-PC argument, apart from price (you get what you pay for!) then I'd like to hear it, but for the time being, keep up the good work *Amiga Shopper*, you're an excellent magazine.

James CC Darling
Bracknell

Points taken James – though I doubt whether your Amiga can really give a 486 a run for its money!

I take it then you won't be one of the readers just dying to check out pages 23 to 32 of this issue...

ON THE OTHER HAND

Referring to your recent correspondence on the 600/500 Plus, I find Commodore's marketing strategy rather strange. Having owned a 1.3 for the last three years, an opportunity occurred to pass it on and replace it with a newer model. Looking around the local agents the 600 and the Plus were on display but no technical information on either was available. The salesman could only give a superficial explanation of the differences and changes made, based on hearsay and rumour. When I bought the 1.3 I was given all the pamphlets containing full details of the specification and possibilities. Commodore obviously doesn't bother any more.

The most startling improvement made to the 500 in its seven year life appeared last October unheralded, unannounced. Now six months later it is dead.

As an owner, I received letters from time to time to take out a maintenance contract with the Commodore Repair Centre. How much would that have been worth now?

A friendly dealer in my local town recently told me he has now stopped selling the Amiga – his customers were becoming hopelessly and utterly confused with Commodore's chopping and changing and about the lack of any consistent policy and stability. He also knew of others who had taken similar action.

Using existing experience and the details and comments in the Amiga press, it did not take long to decide on the Plus as it could be bought with 2Mb of RAM much more cheaply than a 1Mb 600.

I did not intend to use a hard drive, and a TV modulator is unnecessary when you have a monitor. Also a numeric keypad is very useful when entering large amounts of numerical data.

Unless you are going to play games, a TV is useless anyway. If you have to use a TV the only way to get a half decent picture is to use something like a Goldstar TV/monitor with a Scart connection which does not use the inferior modulator.

> *"The only computer better than an Amiga I have used is a Sparc-based X-terminal"*

Having tried a modulator out, admittedly with an old but still serviceable telly, the picture was worse than I can remember on my rubber-keyed Spectrum.

As for using the 600HD for serious applications, just look at the Capt. Diamond advert in issue 17 where it is offering an Amstrad 386SX PC for £800. This comes with an 80Mb HD, 4Mb of RAM, a 1.44 Mb disk drive, a 10" high-resolution colour monitor, mouse, two speakers and a joystick along with MS-DOS 3, *Windows* and software, all running at 20MHz.

Just suppose you were to choose a 600HD. To make it comparable, Evesham Micros can supply a 600HD with an 80Mb HD for £580 and its prices are usually competitive. However this will have 1Mb of RAM and, as everyone knows, a 600HD with a hard drive fitted only has about 0.7Mb of RAM available. Any serious software needs at least 1Mb to run, so you will need a 1Mb RAM expansion as a minimum. Possibly a lot more.

So add on another £40 taking the price up to £620 and you haven't got a screen yet. The remaining £180 difference has to provide a colour monitor even if it is only a 10". After all that you would have a system with half the RAM, an 880K disk drive, no joystick and no software running at 7MHz.

There really is no comparison and I think Commodore needs to get its act together if it is going to stave off the threat of ever decreasing prices for PCs which you can now obtain in bits and pieces to build up your own customised system.

You might ask why did I buy a 500 Plus instead of a PC – well I use it as a hobby and like playing about. I am an AMOS fan, and already had a 1084S to use and it would have cost a lot to scrap everything and start again with another system. But I must admit Commodore does strain its customer loyalty to the limit.

GH Jones
Leicestershire

All I would say is that all computers are mere boxes and it's what you run on them and why which makes the difference – not the particular spec of the hardware.

BUT THEN AGAIN

The replies you gave to the worried A500 owners in issue 16 greatly reassured me, a fellow A500 owner. However, in the light of your saying – "It's not as though 1.2 million Amigas... are going to disappear off the face of the planet... (and) sheer force of numbers is going to maintain a healthy market provision because developers can't afford to ignore such a massive user base..." – I thought you would like to know of the treatment given Kickstart 1.3 owners (and there are hundreds of thousands of us) by some well-known companies.

I purchased a new Vidi 12 by mail order and eagerly awaited its arrival. The morning it arrived I ripped open the envelope to see what I had bought. Among the packaging I came across an envelope. Strange, I thought, what's that for? To my shock I soon discovered that I had to send for the program disk, as the disk supplied is for Workbench 2 users only. To add insult to injury, the order form says the 1.3 disk is "*Free*!" I should hope so!

The most annoying aspect of it all is that it would cost the suppliers peanuts to include the disk in the first place. The packaging even states – "Compatible with all Amigas... includes... software".

I certainly feel that as a Kickstart 1.3 owner I "have disappeared off the face of the planet"!

Gavin Dodds
Tyne and Wear

It would be a little wasteful for a company to include both disks though wouldn't it? – and I guess the reference to compatibility with all Amigas means those running Workbench 2! Yeah, you're right of course, but surely it's not that bad a problem to sort out?

AMIGA VERSUS ATARI

I have been reading the rumours of new Amigas with interest, also about the rants and raves of A500/A500 Plus owners concerning the A600. The expansion port has been removed but I'm sure the hardware makers will find ways of connecting accelerators and everything else to the credit card slot.

Last time I wrote (issue 9) I had an A1000 but soon upgraded to an A500 Plus. The A600's appearance has annoyed me in that my machine will plummet in value if the A600's price comes down, making it difficult if not impossible to get enough for a new Amiga.

So I am seriously considering one of these Atari Falcons. Their specs are very interesting – the graphics won't be as good as the new Amigas but the sound may well be a lot better and if there is a 16-bit sampler chip (ADC) built in, this may be the deciding factor for me – and I'm a diehard Amigan of five years now!

Here's the comparison:-

Colours
New Amiga 256/4096/256,000
Falcon 256/32,000
Palette:
New Amiga 24-bit (16 million)
Falcon 16-bit (256,000)
Resolution
New Amiga 1280 by 960
Falcon 640 by 480
Sound output
Amiga 4 channels 16-bit 57KHz
Falcon 8 channels 16-bit 50KHz
Sound input
Amiga 1 channel 8-bit 22KHz
Falcon 2+ channels 16-bit 50KHz
CPU
Amiga 68030 16MHz
Falcon 6830 16MHz
DSP
Amiga 56001
Falcon 56001

Besides these, the Falcon includes sound de/compression, direct to disk recording, and connection to CD-ROM drives – all for £399. Other specs include IDE/SCSI 2, possibly on both machines, and many other similar features.

Don't believe me? Take a run over to the *ST Format* offices and have a look. The features of the Atari have all been seen, unlike the new Amigas which are the result of rumours and developers breaking non-disclosure agreements.

But if they are true, Commodore will have a serious fight on its hands and unless the price is low enough Atari will wipe up the entire market. I imagine Commodore would be safe graphics-wise but Atari will eat the entire sound market and Commodore will not get a look in unless the sound input/output question is solved – I know where my money will be going, being interested in sound.

But there is hope yet – Commodore will probably cut its prices and the sound input/output could be improved to match the Atari by using a 56002 DSP chip at 40MHz – the sound channels could be doubled if not quadruped (or more!). Unless the sound chip itself is modified to give 8 or 16 channels, and a 16-bit DAC (sampler) chip is added at fairly low cost – I know as I nearly became a Commodore registered developer last year making 16-bit samplers. A de-interlacer is supposed to be fitted to the new Amigas with 1Mb video RAM, increasing this to 2Mb would allow all modes (including overscan) to be de-interlaced at fairly low cost.

No doubt Commodore is considering its moves at this time already, but with the competition showing its new machines, Commodore will be able to react. Will it at least add a 16-bit ADC for recording sound? How will the CDTV be changed with Atari also considering such a machine? Will it supply a monitor capable of showing the new super duper ultra hires modes? The price of such monitors as I have seen is about £800.

A previous Commodore tactic has been to keep the price of the Amiga higher than the Atari to give the impression of a superior machine being worth more. Would this be a wise move in the current economic climate? Consumers may simply go for a cheaper machine because of the lower price.

Nicholas Blackford
Bangor
Wales

Of course, all your 'New Amiga' specs really put the 'spec' into speculation, but I have to admit, the Falcon really is an incredible deal – it even has a built-in genlock! Still, can't see it selling in big numbers though – who's developing for it? Answers on a postcard please...

'I CAN LARF ABOUT IT NOW' SPECIAL

Have you learned a valuable lesson from the trials and tortures of experience or overcome some mind-boggling problem through incredible ingenuity or even sheer luck? Then let us know and win yourself a fiver into the bargain. Just send your post-embarrassed tomes to 'I can larf about it now', Amiga Shopper, 30, Monmouth St, Bath BA1 2BW.

1. Printing was just a drag...

I have recently purchased a Citizen printer to use with my Amiga 500 Plus and have often used it for printing colour graphic images.

As you know this can be slow and like most other people, I sit playing with my mouse while I am waiting. It was while doing this that I discovered a way to increase the speed at which my print-outs are produced.

I noticed that, between sweeps of the print-head, there is a delay, presumably while the Amiga converts the screen image to codes for the printer. I have found that if I 'drag' the current screen, usually *Deluxe Paint IV*, so that it is out of view, (ie, the menu bar is at the bottom of the screen), the gap between sweeps of the print-head is greatly reduced. In fact I would estimate that the printing speed is increased by about 2-3 times.

I suspect that this phenomenon is due to the Amiga not needing to process the screen, but I expect you will be able to clarify this. Anyway I thought you would like to pass this tip on to other Amiga users. I suspect this speeds up all processing, not just print programs, although I have yet to attempt to prove this.

John Hedger
Luton

2. Trouble pin-pointing the problem...?

The following story may seem to some people a bit strange, but at the time the solution to my problem seemed quite reasonable.

I am the proud owner of an Amiga 1500 and approximately 6 months ago I decided to become one of the elite accelerator card owners, so off I trotted and bought myself a Microbotics VXL-30 68030 board. To those who don't know, this board is of the 'piggyback' variety which means that you have to take out your existing 68000 CPU, mount the VXL in the 68000 slot and then remount the 68000 in a slot on the VXL.

Now, installing all this on my 1500 meant that I had to take off the power supply and disk drive mounting which covers the 68000. This meant I had to unplug the main ribbon connector which connects the drives to the motherboard. Everything seemed OK, the mounting came off, the accelerator went in, and the mounting went on again. But, horror, when I tried to use the disk drives afterwards, they just would not work, proclaiming every disk to be corrupt.

So, off I went, back-tracking the installation procedure, checking all the connectors and pins etc and guess what I found? One of the pins on the motherboard which fits into the disk drive ribbon connector had snapped off and the pin was stuck in the plastic connector which fits over it. After nearly having a nervous breakdown, thinking of the time it would take to send my 1500 back to be repaired, I decided to do a little bit of home electronics.

What I did was to snip the point off a drawing pin, trim it to size with some pliers and shove this into the plastic connector, down the hole where the snapped off pin was, so that a little bit of drawing pin poked out of the connector. I then pushed the connector onto the motherboard so the new pin made connect with the motherboard and effectively took the place of the snapped pin. After re-assembling my 1500 and trying to use the disk drives, success! So, at the moment, my two disk drives on my 1500 are being used through the help of a drawing pin. It has been six months since this little bit of DIY and I have done a few more internal alterations to my 1500 (hard drive, RAM etc) and the disk drives are still working perfectly.

I am glad to say that I can laugh about it now.

Martin Linklater
Cleveland

3. Icon see clearly now...

You will be amused with what happened to me when I first set up and used my Amiga 500 Plus (inc GVP 52Mb HD). I kept trying to load KCS and *Super Jam* but couldn't do it!

Discussions with Zone had no effect, but it wasn't until I used the "Show File By Name" rather than the usual ICON that I spotted the cause – the symbol for both KCS and *Super Jam* were in fact loading exactly behind the DFO symbol – showing by name gave them peeping out coyly! Has anyone else had this trouble?

John Fisher
Essex

THE AMIGA:

– Where it's been... where it's at... and where it's going...

Gather together Amiga Shopper's experts panel in a conference room, offer 'em free drinks and set the ball rolling with news of a new Amiga – and what do you get? Arguments. Loads of 'em. Like, is the PC really a better deal?, are the consoles trouncing us?, is CDTV just a load of hype?, will the A2200 be worth waiting for?, what use are credit card slots? and do you want to step outside right now?...



Let's assume that after Xmas 93 the Amiga games market has plummeted....where does that leave the Amiga?

Andy Storer, editor, Amiga Shopper



It leaves the A600 dead... Commodore would have to go A3000 upwards...

Jeff Walker, DTP expert and consultant editor



What it'd also have to do is improve Workbench considerably, improve the whole of Intuition – it's nowhere near as good as the Mac interface...

Mark Smiddy, developer and consultant editor



I run my productivity software on a 500 Plus – it's a better system than a 486 PC with Windows – Workbench is easier to use

Jolyon Ralph, CDTV developer



So look at emulators then, that's another thing that'll keep selling Amigas

Gary Whiteley, video correspondent



But the Amiga's just starting now... in just two years we've had a new Workbench, 24-bit graphics, 16-bit sound cards and ARexx – it's the most exciting year since 1985

Jason Holborn, AMOS and ARexx expert



But how many of you here thought 'Wow, what a great move!' when the A600 was launched? I bet most of you didn't...

Wilf Rees, education columnist

Just some of the choice extracts from the no-holds barred debate about to start over the page – pour yourself a beer and enjoy!...

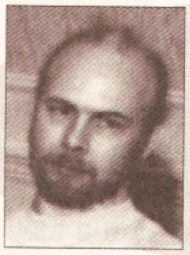
THE FUTURE STARTS HERE



The Amiga Answers panel all set to embark on a two hour discussion on the potentials and pitfalls facing the Amiga range. Will this year be the best ever?

AS: So let's kick off by asking what everyone thinks about Commodore's decision to announce a new Amiga based on the Motorola 68020 chip?
MS: Well, it's a logical step.
JR: There's still a price advantage on the '020.
JW: They did say that this new machine would be sub £1000.
MS: Is that going to be with a monitor, or is it going to be like a 2000?
JW: That's without a monitor. Basically, it's going to be a 2500, but cheaper and with higher specs.
WR: Was there any mention of a MIDI interface?
AS: No; Commodore hasn't said any more.
WR: What about the rumours of Roland sound chips, and of graphics chips?
AS: There were no details other than that it would be '020-based.
JR: If it's '020-based with a new board, rather than a standard 68000 chip with an '020 card fitted in, like the 2500 was, then it's going to have an '020 with full 32-bit access to Chip RAM, and a full 32-bit memory access.
AS: What sort of performance advantages is an '020 going to give you over a standard 68000?
JR: It depends on the speed the chip's running at. Does anyone know?
MS: No, but I would guess 16MHz.
JR: The Commodore plug-in '020 card gives around 4 or 5 times speed increases over a standard Amiga. But a machine with 32-bit Chip RAM should be a bit faster; I would guess about five times faster.
JW: Having an '020 chip would make an enormous difference – the main complaint about DTP for instance is the speed of screen-refresh.
WR: Doesn't it really depend on horses for courses? If this new beast is going to have expandability, lots of slots and so forth, what really is the best option? Are you better off buying the new machine, or are you better off buying a 2000 and putting a GVP 25MHz '030 card for, what, £599? You've got far more speed; you've got far more flexibility, and you've still got all the slots.
JR: Despite being a developer I know nothing about this machine, but from what I gather I would guess that it's going to have Zorro III slots rather than Zorro II, because it's a new machine. Now that provides a lot more flexibility.

It would also make sense if Commodore put it in a 3000-sized case and gave it the 3000 processor expansion slot, which means you'd be able to use standard 3000 '040 cards and go straight from an '020 to an '040. With Zorro III slots you can expand to up to 64Mb of RAM on one card; you've got room for far more intelligent devices. Though at the moment there's only two or three cards that use it...
AS: Do you think Commodore would offer a trade-up on the A500 to the '020-based machine?
JW: No.
JR: It depends: only if it doesn't sell. If it's a roar-away success it won't bother. There's no point in doing trade-ins on things that are doing really well.
AS: So that explains the trade-up scheme whereby you take in your old A500 and get a CDTV.
GW: Out of interest, what does it do with the old A500s?
WR: It puts them in the CDTVs!
JR: Then sends them to Rumania!
AS: That's not what happens... is it?
JR: Commodore obviously was not going to tell me what it'd be doing with the traded-in machines...



"Having an '020 chip would make an enormous difference – the main complaint about DTP for instance is the speed of screen-refresh"

JH: When I first saw a picture of a CDTV with a keyboard attached to it, it was an A1000 keyboard. And at that time in the States, it was doing a trade-in deal where A1000 owners just had to take in their keyboards.
JR: That was the original idea. But it was just too expensive to get all those keyboards, clean them all, re-spray them and put new connectors on them. It actually works out too expensive to do that.

WHAT'S ON THE CARDS?

AS: Do you think Commodore would go for a PCMCIA slot like that in the A600 in the new machine?
JR: It would make sense, if it's going to try and persuade software companies to put stuff out on credit card. One of the main reasons it has chosen PCMCIA is because one of the main faults of the A500 was the edge connector slot, which was unreliable. There were bad connections, you couldn't do decent pass-thrus, and more importantly than that, it couldn't guarantee that with future machines you'd be able to take peripherals off of it and put others on without powering down.

Now this is one of the things about the PCMCIA... if you buy a peripheral, there's no reason why you can't buy a future machine, even something different like a PC, and plug your peripherals into that with a new software driver where necessary, and still use them.
AS: Commodore is also claiming that the memory cards for the new Amstrad NC-100 machine will fit the A600. As I understand it, one of the future uses of that credit card slot would be removable hard disks, small enough to fit in your top pocket.
JW: Oh, you can buy them now.
AS: So can we talk about those kind of add-ons? What do you think we'll see coming out for that slot?
JR: Everything you would get normally plugging into an Amiga's standard expansion. You'll see companies like GVP providing, in the near future, things like RAM expansions for it, samplers... all sorts of things.
JW: Looking through the PCMCIA resource reference book, there are no known Amiga developers in the list of widgits at the moment, so they've got to start from scratch.
JR: One of the things you can do which you can't do with an ordinary expansion slot is plug and unplug things while the machine is switched on. There's no reason if you have a removeable hard disk and a sampler, why you can't plug in your sampler and sample something, then remove it, plug in your hard disk and save the sample.
WR: I wonder if the A670 CD-ROM drive is going to plug into that slot.
MS: Yeah, it is.
JR: There's nowhere else you can

WHAT ARE ZORRO II & III?

Zorro II is the standard for A1500/A2000 plug-in cards. Zorro III, as on the A3000, is a 32-bit standard, giving faster data transfer rates. A Zorro II card may be used in a Zorro III slot.

AND WHAT'S PCMCIA?

It's the interface standard used on the A600's credit card slot. It means that RAM cards, ROM cards, modems and so forth for IBM PCs can also be used with the A600. It is expected to be implemented on all future Amigas.

plug it. Which means that Commodore is going to have the A670 as a boxed unit with a cable coming out and this credit card on the end, which means presumably that if it does produce top end machines with this slot, then it's instantly got a CD-ROM drive for them.
WR: I wonder if the developers will side-step the A600? The one thing that I was waiting to see was some sort of plinth that the A600 sits on which converts it to an A500 with the edge connector/trapdoor configuration.
JR: There's no reason why a developer couldn't produce a PCMCIA card that fits into the A500 slot, so that if you've got your GVP hard disk or whatever, you just plug it in and then you're there. It would almost certainly need its own power as well, though.

DREAM MACHINES

AS: Talking about new machines and so on, maybe we could just go around the table and ask each of you what, from your chosen specialism, your wish list would be on this new Amiga?
WR: I would have thought first of all a MIDI interface. The Atari machines did so well because of this.
JR: Yeah, I agree. It would be a trivial thing to add – that's why Commodore put one in the CDTV.
AS: What about graphics?
WR: I think it's pretty well served with graphics.
JH: Well, if we were going totally crazy, I'd like to see a macihne that's '030 based at least with a 32-bit architecture and with a custom chip set that was 32-bit as well; 24-bit graphics as standard on a standard screen; 16-bit sound with 8 channels; MIDI as standard.
JR: You can build up this system already.
JH: That's right, the talk about the A4000 is you have 24-bit as standard, so the machine I just described is not entirely crazy.
JR: The point is we've got to look at the fact that the market for base machines with 24-bit graphics and 16-bit sound isn't there. It's not going to be there until there's a vast amount of software that makes use of it.
MS: It's like the chicken and the egg.
JH: I don't know if it is a chicken and egg situation though... if Commodore creates the market, if it puts out a machine with this kind of hardware...
JR: All I'm saying is that it can't afford to put too much in – that will raise the price too high.
JH: Then why is it talking about bringing out the A4000?
MS: Who's talking about it? It's just a rumour.
JR: But you can buy all these things as add-ons anyway.
JH: Yeah, but a lot of users don't want to have the hassle of choosing this card or that card to fit in their machine – they want them to come as standard.
JR: You can always get someone to make one up for you like that.
MS: The problem is that no-one is going to want to develop software for a configuration that only a small number of people possess. If it was a case of 8-bit or 24-bit colour as standard in the machine, then developers would *have* to make use of it.
WR: It's all about configurations though, isn't it? 15 years ago if you bought a British car – 'you want carpets? – that's extra'; 'you want knobs on the doors? – that's extra'. Nowadays they've all got electric windows, adjustable seats, and so on, because the competition has forced them to do that.

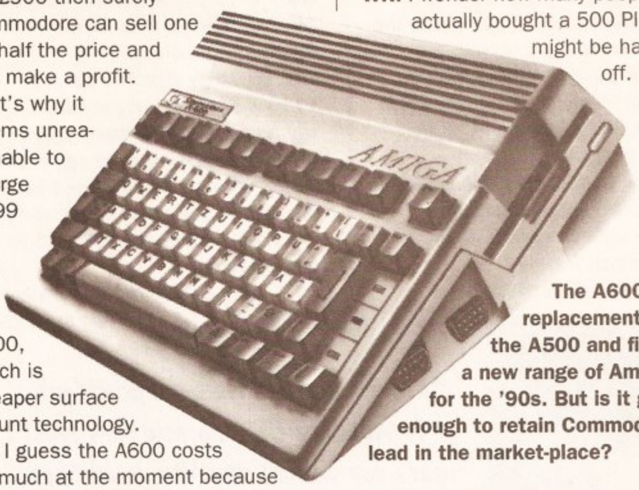
Now what we've got is the situation where the PC market has grown in terms of its graphic capability and its sound capability. It's starting to catch up.
JR: But in the PC market there is no standard, still. You have to go out and buy your computer in a box and you buy your sound card and then go out and buy your graphics card.
WR: But some of them are getting together and putting packages out so you don't have to do that.
JH: Exactly, a lot of companies are selling PCs with these cards already in them.
JR: At the end of the day it's usually the dealers who put them together. There's no reason why they can't do the same thing with a new Amiga.



"The problem is that no-one is going to want to develop software for a configuration that only a small number of people possess"

THE WORD ON THE A600

MS: You can't do that with the A600 though. 90% of users don't want the all-singing, all-dancing machine, they just want this capability in a base machine.
JW: But they're not going to get it at that price; otherwise it wouldn't be a base machine.
JR: What's going to have to happen if and when the new technology comes out, is that it's going to have to be in the high end machines first so that the software developers can develop for it.
MS: The 68020 is not new technology: it's old, years old. The 16MHz '020 is old technology. Good God, if Apple can sell a machine with an '020 in there running at 16MHz for £900 then surely Commodore can sell one for half the price and still make a profit. That's why it seems unreasonable to charge £399 for the A600, which is cheaper surface mount technology.



The A600 – replacement for the A500 and first in a new range of Amigas for the '90s. But is it good enough to retain Commodore's lead in the market-place?

JR: I guess the A600 costs so much at the moment because Commodore has to pay off the cost of converting its production lines over to surface mount technology. Once these costs are recovered, I can see the price of the A600 coming down to under £200.
AS: You can get A600s in Germany for a third off the price here. Kelly Sumner (CBM's UK MD) was saying that that was because it doesn't include on-site maintenance as part of the deal there, and yet at the same time he was saying that the failure rate it had had so far was something like less than 1.5%. Whereas the A500 Plus was 8.5% or so.
JR: This is the major advantage of going over to surface mount.
MS: That's true. It's physically much more robust.
WR: But there are also disadvantages. I wonder how many people started with Kickstart 1.2 and then upgraded to 1.3 and...
JR: The ROM is still socketed, so you can still upgrade Kickstarts. The only other real problem that the A500s had was that it was very easy to blow CIA chips, and apparently there's now better protection on the A600 for them. It's now far more difficult to blow the CIA chips.
JH: Oh good, because I've blown loads of them in the past.
WR: I wonder how many people actually bought a 500 Plus and might be hacked off. I think Commodore lost a lot of street cred for that. It seemed to be half-hearted; it just slipped in; a lot of people bought it and they must have been really hacked off.
JR: I think possibly that it just had to release the A500 Plus because it ran out of the old chips; it ran out of 1.3 Kickstarts and Denises and what have you; and it didn't want to produce a new batch. The A500 Plus came out a lot earlier than expected.
WR: Well that stinks of crisis management rather than planning.
JR: Well the A500 was selling far higher than expectations, so all Commodore's planning went out the window.
WR: But the punters in the street suffer, because they go out with their money and buy a new machine...
JW: Oh, I don't think somebody who has bought an A500 Plus has suffered. It's a good machine.
GW: But people are hacked off by the marketing strategy, not by the machine they've got. Because they've gone out and bought a box, and then suddenly a new one is out.
JR: But then you get that in any market. You go out and buy a car, and then next week the company brings out a new car. It's inevitable; companies have to release new products and people will always get annoyed if they're the people who bought the old product a week before.



"I wonder how many people actually bought a 500 Plus and might be hacked off. I think Commodore lost a lot of street cred for that"

JW: That's right. I've bought things and next week they've gone on special offer.
MS: Still, the A600 was a bit of a joke wasn't it?
AS: Why do you think that?

MS: The original machine was an A300.
JH: It's written on the circuit board.
MS: Yeah, so why market it as an A600 above the A500 to replace the A500. Why not carry on with the A500 and put the A600 out as a lower end machine? Keep the A500 as it was and release a PCMCIA adaptor for it.
JR: I think Commodore has dropped the A500 because producing a machine without surface mount is just too much trouble.
MS: But it could produce the A500 using surface mount.
JR: But why confuse the market by releasing two new machines at the same time? The A500 and A600 are basically not that different. They're both aimed at the same market. Because of the surface mount, the new A500 that you're proposing would be less expandable than the ordinary A500 anyway, in terms of internal expansions.
MS: It could have gone for a 16MHz 68000.
AS: Why do you think it didn't?
JR: Difficult. I think software incompatibility. Commodore is very scared of the STE-factor. That's the main thing. The STE came out and *New Computer Express* crucified it because it didn't run all the ST games.
WR: I would have thought it would be a better idea to put an '020 in the A600 along with a fall-back mode. And that would have made all the games work...
JR: You can never have a fall-back mode that works 100%.
WR: Well that's a technical problem, that's not one I'd be concerned with, that's up to Commodore.
JR: What it could have done is have a switchable 68000 which by default runs at slow speed, so you can boot up your games and they run slow, but from which you can run a program from Workbench to switch the chip to 16MHz mode. That would have been more sensible.
MS: Which is what has been done in PCs for years.

PRICE & PERFORMANCE

WR: Which brings us back full circle to the first question. I would question anybody's sense in going out and buying a 68020 machine for under £1000 when for a little bit more you could get a 68030.
JW: It's not a little bit more. We're talking about the Amiga market.
WR: I'm talking about the A3000.
JW: That's not a little bit more: that's £500 more.
WR: Well they've come down to £1400, so somebody will start aggressively pricing them again.
JW: OK let's say they're aggressively priced down to £1200. The new '020 machine is aggressively priced down to £700 – you've still got a £500 price difference.
WR: But I'd rather save and pay the extra £500 and get a faster machine.



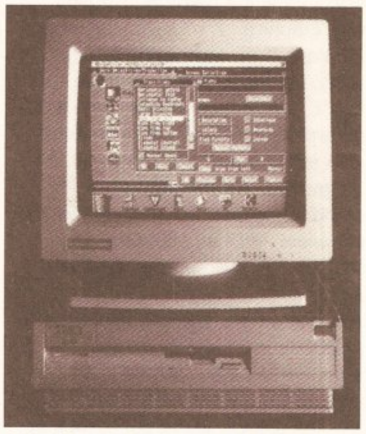
"I heard a quote from the president of Commodore US who said that most users don't want anything more than a 7MHz 68000"

JW: A lot of people will.
JR: That will be the right sort of placing for the machines then. Nobody should moan and say 'why have they brought out this machine with an 020?' – because you've got the option of spending more and buying a machine with an '030.
GW: It's filling a gap.
JR: Yeah, it's just filling an obvious gap in the market. You've got a base machine with a 68000; then a machine with an '020 and a machine with an '030 – something for everyone.
WR: But my argument follows on if you look at comparative markets. If you go back to when the Amiga first came out, it was a 68000, it had limited screen memory and limited RAM on board, OK, but it's still the same processor now. I would have thought that after seven years they would have got it a bit faster. Look at how the PC market has changed: you bought the XT running at God knows how slow!
JW: What you're saying is you want a base machine that's as good as...
WR: No, I'm saying it should have been faster. I think the new A600 should have been at least a 68020.
JR: Yeah, it should have been... perhaps it'll change it.
MS: I think the STE-factor that you talked about, which is quite legitimate, was actually caused more, in Atari's case, by the new custom chips, which is exactly the same as with the A500 Plus. As soon as you put the Super Fat Agnus in there, some games just fall over.
JR: It was actually very clever of Commodore to ensure that the Plus wasn't a disaster in the same way as the STE.
AS: I heard a quote from the president of Commodore US who said that most users don't want anything more than a 7MHz 68000.
GW: Well they're not being stimulated to want one.
JW: Are they asked? If 90% of Amiga 500s and A600s are sold to games players, what advantage can a better processor have for them?
WR: Not everybody uses their Amigas just for games.
JW: Yes, but 90% do.
GW: But there's some sell through as well. You hook them by selling them a games machine, and then you try and educate them into other uses...
JR: Kids are not going to be interested in a faster processor unless it makes *XCopy* run better!
WR: I think that's naïve to be honest. I work with kids all the time; and 90% of the kids I know like games and play games, but they're more concerned about serious applications. They use them for school work; they do their homework on them; they're working with them all day at school. Anything that can make it faster, make it more efficient, make their output look better, then it's got to be a plus.
MS: If you look at the games coming out on a PC now, many of them need a minimum configuration of a 20Mb hard disk and a 386 processor. Whereas we're stuck in the Amiga market with a 68000 at 7MHz. Which is crap.
WR: It's old.
MS: It's old; it's outdated.
WR: It's a starting point for the A600 for the next how many years? Five years? Is it still going to have the same processor in five years time?
JR: I doubt it very much.
WR: Then why not change it now?
MS: This is what Commodore should have done.
JR: It can't do it now because it's only just been launched.
JW: If you want a machine with an '020 you can buy one.
MS: But to get it as the base machine...
JW: Everybody's saying they want a base machine with an '030 in it, but they don't want to pay out the money
MS: No, but certainly an '020 at 16MHz doesn't cost that much more.
WR: But look at comparative markets – what's the entry level for a PC? XTs have gone.
JW: But base machines are sold to games players.
WR: Well if you want to label our machine as a games machine...
JW: It is!
WR: I don't think it is.
JW: It doesn't matter what *you* think it is, it is.
GW: When you say they're sold as games machines, are they perhaps sold like train sets used to be? Dad goes out and buys a train set supposedly for the kids but Dad uses it to play games, but what do the kids do with it?
JW: They're sold to kids as games machines; to the parents for their kids. It's changing now with this new point-of-sale thing. That's changing because the centre point is CDTV, and there's all this software arranged around it, and there's lots of applications and information CDs there.

The actual marketing of the base Amiga is changing, but it's still going to sell it in packs later on. The A600 at the moment is being sold in the *Cartoon Classics* pack. It's for games!
WR: It also did the educational package, which sold extremely well.
JW: It didn't sell extremely well.
WR: It did.
JW: It didn't. There were nowhere near as many numbers sold as of the ordinary A500. It sold a few thousand, but the A500 has sold millions.

CONSOLE COMPETITION

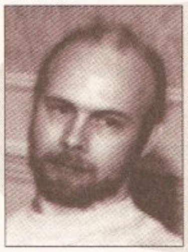
MS: I think something else we've got to look at if you say the Amiga is a games playing machine, is the console market, which is the true games playing market these days. The Super Nintendo and the Mega Drive both leave the Amiga standing, and both cost less than £150. Why would you buy a games machine with less power for more money?



At half its old price, the A3000 is now a very attractive proposition

JW: I don't know but people are.
MS: I work closely with a few shops, and their main sales now are in Super Nintendo and Mega Drive. Sales of Amigas have virtually ground to a halt, especially with the A600. It couldn't sell the A600 when it first came out; now it's starting to gain acceptance. If people want to play games they buy cartridge-based consoles.
JR: The only thing is that in the console market games cost £40 a time, and they're not readily copyable. The other thing of course is that the variety and range of

games on the Amiga is much better.
MS: But the vast majority of games on the Amiga are rubbish, especially when you compare them to the likes of *Sonic* or *Mario*.They're only £10 more, but the kids will just play them and play them and play them. There's so much more in them.
AS: OK, can we assume for a moment that after Christmas 93 the games market for the Amiga has plummetted. Basically people are buying SNES and Mega Drives. Where does that leave the Amiga?
JW: It leaves the Amiga 600 dead.
AS: So, if we had a scenario where the Amiga wasn't being bought as a games machine anymore, do you think that leaves the Amiga as a sort of poor man's Mac? If you look at the Mac as being *the* DTP machine par excellence, could you see the Amiga as being *the* video and graphics machine?
JW: With the right software, and with the hardware we were talking about right at the very beginning. That's exactly what would have to happen if the games market fell through. Commodore would have to scrap the A600, probably have to scrap the '020-based machine, and go A3000 upwards.
MS: I think what it has also got to do is improve Workbench considerably, improve the whole of Intuition. Intuition is a great idea, but even now it's nowhere near as good as the Mac interface.
JW: Also third party software has got to get better.
JR: That's not true! It's the software that uses it! The actual support under Intuition, particularly if you have Kickstart 2, is there, it's just that the software companies are not using it; they're not following the style guide.
JW: Kelly Sumner made this point talking about the new '020 machine and compatibility. He made the point that they're testing everything, and developers still aren't using the operating system.
JR: From a developer's point of view I know that Commodore is actually pushing very hard in that direction at the moment. It's doing a lot of work on that.
MS: It's all very well saying the operating system's got all these fancy features and extras, but at the grass roots level it's still not open-ended. Commodore should have come down a lot harder, a lot earlier, enforcing guidelines, like Apple did. If you get a Mac and you type [Command]-O, that's 'open a file', always.
JW: That's easy to say in hindsight, but it didn't happen.



"If anybody wants to learn about their Amiga, wants to know how it works, what it can do, what it can't do then they should buy the Fred Fish disks"

JR: It's being retrospectively fitted now to the software. If you look at the guidelines now there are actually instructions as to how your menus should be laid-out and so forth.
MS: Why aren't all of them doing it?
WR: But some of them are. If you look at the inclusion of ARexx, there are a lot of software houses now writing macros in ARexx that are built into the software, and that's an example...

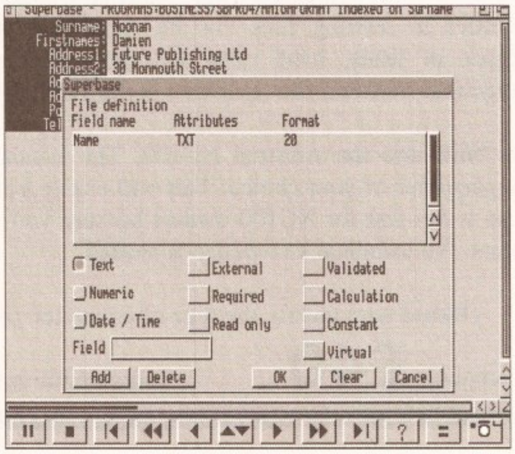
PD PULLING POWER

AS: So are there any other reasons why the Amiga will still sell despite the consoles?
JR: Public domain software is a legitimate reason for buying a computer over a console.
MS: But you only find out about PD once you get into computing.
JH: Most new users won't know anything about it.
WR: And unfortunately PD still, despite the fact there's some really good stuff, has this tacky image about it.
JW: There are more than 100 Amiga PD libraries, all of them coining it in. If you look at PD for the ST, the Mac, and even the PC, it doesn't compare.
MS: Mind you the PD houses are starting to crash now.
JW: Yeah, there's too many of them. The point is there aren't so many libraries because there is so much decent software; there are so many libraries because so many people want what there is.
JR: The PD libraries are also going to have problems when the CD-ROM arrives. You'll be able to get a whole PD library for £20!
GW: There's just the transit time of getting PD on to a CD.
JR: This is it: there are always going to be people who want this week's demos, and failing getting a modem and downloading them, the only way to do it is through a PD library.
GW: I think PD is probably a marketing strategy that Commodore has missed. I think it has seen that now, though.

JW: If anybody wants to learn about their Amiga, wants to know how it works, what it can do, what it can't do, then they should buy the Fred Fish disks, use everything and read everything. You may not find them useful again, but you'll learn something.

THE POWER OF AREXX

JR: Is there anything like ARexx on the Mac that enables you to integrate packages so easily?
MS: Well, there is now, but it's not as easy as with ARexx.
JW: I know it sounds like I'm biased towards DTP, but the Genies in *Professional Page* are a perfect example of what ARexx is capable of. It's stunning what you can do.
AS: What can you do?
JW: You can automate page make-up. It's as simple as that. You can do it once, and it's done for all time. You just tell it which files to load, and it puts them into boundary boxes and it's done for you. You just press the button and it's done. Things like if you need various graphics arranged on a page and you want them to automatically go into the boxes of the size you've drawn them, and then you want the whole thing to be scaled down to 50% of that size and then moved and then copied over on to a little panel on another page on another part of the publication or something... it comes with a whole bunch of them written for you. But there are also programs. If you wanted to do what I was just talking about you could write your own ARexx script; so you've got to learn about ARexx which means you've got to learn about programming, which frightens people.
MS: People do say 'I can't program' without even thinking about it.
JW: That's right, they just assume that programming is something that only clever people do. But ARexx makes it very easy.
JR: The advantage is that once you've learnt ARexx you've learnt how to control just about every productivity package for the Amiga.
AS: Do you think Commodore should be bundling ARexx properly with the A600?
JR: It is bundled.
AS: Not completely...
JW: What's not bundled are the manuals. The users don't even know they've got ARexx.



ARexx reinforces the Amiga's multitasking capabilities

PRODUCTS OF THE YEAR

AS: I'd like to ask everybody what the most exciting product they have come across this year is.
WR: A bit of software called *MicroMeasure*. It works with a genlock and a video camera, and it enables you to calibrate the screen and to record movement, time, distance... I like it because unlike most software it's completely divergent. What you use it for is up to you. So, for example, you could view someone throwing a discus and put markers on them, you could analyse the body movement. You could put it on dancers, insects moving across foliage. It's a very clever bit of software.
MS: Progressive Peripherals' '040 accelerator for the A500. Software-wise, the best package I've used this year is *Professional Calc*, but the third party hardware developers are well in advance of the third party software developers.
JR: Hardware-wise I think the new AD516 stereo 16-bit 8 track sound card, which is pretty amazing. For software, the new version of *NComm 2* for the A600 is pretty good. It supports the credit card slot for paying for on-line services.
GW: I suppose the AVideo 24 card, because it's cheap and it does the job, even though you have to plug it inside the machine. I think it's an interesting piece of kit that maybe ought to be bundled with professional systems.
JW: ARexx. I think it's the most underrated, unknown piece of software. It's tremendously exciting.

IS CDTV THE KEY TO COMMODORE'S FUTURE?

AS: Commodore is about to put 450 point-of-sale units in high street shops like Dixons. At the centre is the CDTV with keyboard, flanked by about 30, 35 titles. Beneath it is the standard 600 and the 600 with a hard drive. I think it's quite interesting that CDTV is taking the centre stage. That it's now the

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leading Amiga brand. That's the way it is being positioned. Linking that into what I was saying earlier about the possible demise of the Amiga games market, do you think Commodore's long term thinking is that of the Amiga CDTV computer as its saviour?

JW: Commodore doesn't actually say that, but I think everything it shows confirms that.

WR: But isn't it typical of Commodore, for something that's going to be the future, and be revolutionary, to put the old Amiga with a 68000 into CDTV.

GW: And 1.3 based, at that.

WR: Yes. If it's going to be the biz, why chuck a seven year old machine in at the centre of it?

GW: And a Welcome disk that tells you how to switch the machine on!

AS: Do you think that it would be a sensible move to take a 500 along and come away with a CDTV computer? What are the benefits?

JR: Well you're getting an extra year's guarantee!

AS: Can you easily add upgrades to CDTV? Can you hook printers and memory and so on?

JR: Yeah, it's got all the standard Amiga ports. It's got two internal expansion ports. One of them is a video port in which the modulator usually fits, so obviously it's got an internal modulator. You can take that out and put in a genlock.

JW: Do you think it's this kind of hardware that will sell it?

JR: It's the software that will sell it. I know there are several companies doing very big CDTV projects; it's just that they're all going to appear between now and Christmas. They've all been waiting for the A570 to launch.

JW: So while these titles are going to sell the CDTV, they are also going to sell A570s to A500 owners, and they're going to sell A670s to A600 owners...

WR: What about A2000 owners?

JR: Well you can already get a CD-ROM that will fit inside the A2000.

JW: What are developers using?

JR: The Toshiba.

JW: That's the one that works with *almost* everything.

JR: Well, no, the only thing it doesn't run is software that calls the CDTV libraries, the CDTV ROMS, because they aren't on the SCSI card. Unfortunately all the good titles do. There is a way around this which is to produce a software emulator for the CDTV device. Such a thing does exist; but I can't talk about it.

MS: You just did.

JR: The problem is licensing; the code belongs to Commodore, and if you're doing a CDTV compatible drive you've got to license the code from Commodore.

GW: Talking about emulations, that could well be another thing that's selling Amigas.

JR: Commodore's latest brochures put a lot of emphasis on the emulators, particularly A-Max.

AS: Do you know of any developers who are bringing out serious applications on CD-ROM?

JR: Yes. For example New Horizons are doing *ProWrite, Flow, Design Works* and whatever on a disc, so there's a mini office station on a CD.

AS: On the PC, for instance, *Corel Draw* is out.

JR: Well this will be the favoured way of distributing software. It's a lot cheaper to produce one CD than it is say ten or eleven disks if you've got a big package. Plus, of course, it is secure. So I would not be surprised if *Pro Page* or *PageStream* or whatever come out on CD, or at least become optionally available on CD.

MS: What's to stop people pirating from CDTV?

JR: Audio. You can pirate the games, but you can't get the CD sound. If you look at pirate bulletin boards, you'll see things like *CDTV Lemmings*, but they've got no sound.

JW: I don't think people will really appreciate the CD audio until they've heard it.

AS: I can't see any software coming out on credit card, because the unit price is so expensive. Who's going to develop on something with a high initial cost?

JR: That's probably the case for a RAM card. But ROM cards are going to be no more expensive to produce than a standard console cartridge. Because it is essentially the same technology – all it is is a surface mounted ROM chip.



"The software I've seen on CDTV is not good enough at the moment"

AS: Isn't that going to be much more expensive than an equivalent CD?

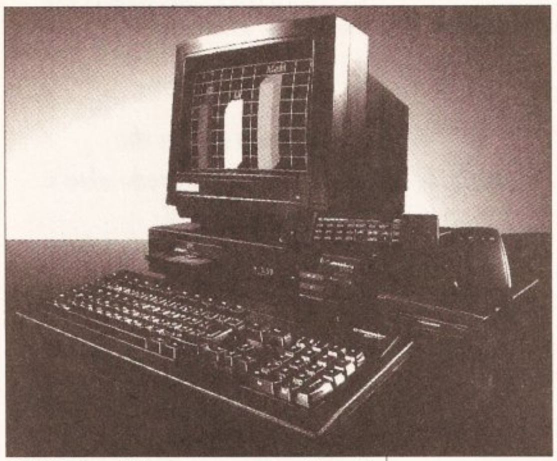
JR: This is why I think the credit card slot is mainly going to be used for hardware expansion.

AS: Jason, would you buy yourself an A570?

JH: I've been thinking for a long time about buying a CDTV, but at the moment it's not the sort of thing I need. The software I've seen on CDTV is just not good enough, at the moment. I've seen a lot of CDTV software and the only disc that I could say I've enjoyed playing with is *Japan World.*

JW: I think it will be after Christmas before we see a large base of really good CDTV software.

JR: Another thing is that, at the moment, there is no way for amateur programmers to access CDTV. That will be fixed when *AMOS Professional* comes out, which will have a CDTV extension. With this you'll be able to write your own custom audio player or Karaoke player. It's great fun playing around with CDTV as a sort of programmable CD player.



CDTV – heralding a new generation of home and productivity software?

GW: When you talk about putting *Pro Page 3* on CD, how much memory can you stick in a CDTV, because you're going to need a fair bit?

JR: The base machine is not expandable, but you can now get the 2Mb Agnus chip to give 2Mb of Chip RAM inside the CDTV.

There's also the Blizzard Board which is an internal thing that sticks on the 68000 chip. That will give it a double speed 68000 and up to 8Mb of Fast RAM.

THE PC /AMIGA WAR

AS: Has the PC caught up with the Amiga, and does it represent better value for money?

JR: No; no.

MS: Yes; yes.

JR: It depends what you want out of the machine. At the end of the day they are just boxes that do jobs. And if it does the job you want it to do at the price you want to pay then it's value for money. Personally, I've got a 486 in the office which is sitting around doing nothing, just wasting our money.

MS: How much did you pay for it?

JR: About £1000. Yeah, it's a very fast machine, but I don't use it.

AS: If somebody out there has a choice between Commodore's new '020-based machine and the equivalent PC for the price, at least a decent 386DX, which should they go for?

JW: The question they have to ask first is 'what do I want to do with it?'

JR: A computer is only a tool for running software. Software is far more important than hardware.

AS: Put it another way then: what features does the Amiga have that one should buy it for in preference to a PC?

JW: On the applications side of things, doesn't it turn into a Windows versus Workbench sort of argument?

JR: Yes. I find Workbench far more productive than Windows, and I use both of them quite a lot.

MS: But there's nothing like the DTP application *Quark XPress* or *Word For Windows* for the Amiga.

JW: You're talking about 'killer' applications.

JR: I prefer running productivity software on a standard A500 Plus to running it on a 486 with Windows. It's a better system; Workbench is easier to use.

MS: Workbench is, but the productivity software for it isn't.

JR: It depends what you want to do. For example, look at word processing. I can use *Protext* on the Amiga or I can use *Word For Windows* on the PC. If I'm just writing a short answer for *Amiga Shopper* it doesn't make any difference – I can do the job equally well with either.

JW: Looking at the software side of things, we've all got our areas that we specialise in; in an ideal world what piece of software would we choose to do that job all the time? To start the ball rolling, I'd be using *Quark XPress*, on the Mac.

JH: I'd be using *CuBase* on the Mac for sequencing.

MS: Microsoft *Word.*

JR: I'd be using what I'm currently using on the Amiga. I'm happy.

GW: I'd be using a Cray.

JR: But PC hardware is very cheap. PC software isn't. If you're looking at packages like *Word For Windows*, it's, what, £399?

JW: Quark *XPress* is £790.

JR: So any advantage you've got in the platform price is immediately lost on the software. So unless you're assuming that people are going out and getting their pirate copies of the software, people are going to have to

buy the packages that they want to use.
MS: We know realistically that a lot of people do pirate it. But even so, the difference in price is... to buy an equivalent to a 386 PC you'd have to buy an A3000.
JW: No that's rubbish!
JR: You can get good performance out of an A500.
MS: What! Show me an application that performs like *Word*.
WR: It takes 15Mb doesn't it?
MS: It's big, yes.
JW: The hardware that some of this software requires is expensive.
JR: All I'm saying is that there's nothing really wrong with the basic machine. The system I've got at the moment is an A500 Plus with 2Mb of Chip RAM and 4Mb of Fast RAM, and a 52Mb hard disk. Now that set-up is ideal for productivity work on the Amiga.
JW: So are we saying the only killer application on the Amiga is Workbench?
JR: There are a lot of good applications that are close to 'killer', but I wouldn't say they were at 'killer' status yet; things like *Art Department Professional*.
JW: But that's what the machine needs.
WR: It also multitasks well.
JR: That's the main thing.
JW: What it needs to sell it into the power user market or even the corporate market is one killer application.
JR: Why not concentrate on the emulator boards and use everyone else's killer applications?
JW: That could be it.
JR: I don't think there really is any point in producing say the most amazing Amiga desktop publishing or most amazing Amiga word processing or spreadsheet package, because these packages exist on the Mac and on the PC.
GW: But if you've got to spend £300 on an emulator and £700 on software, you might as well buy a PC.
JR: It's cheaper than spending the money on the PC and the software if you've already got the Amiga.
MS: By definition you've got the Amiga.
JR: The point is, if you only want to run that sort of software, then there is no point in buying an Amiga anyway. The Amiga is a specialist machine.



"Why not concentrate on the emulator boards and use everyone else's killer applications?"

JW: It's a games machine.
JR: It's a games machine; it's a video machine.
MS: It's also a hobbyists' machine. It's something you can mess about with. That's its greatest strength. And it has got the best multitasking around. Unfortunately that's where Commodore has really flopped, because it's not really pushed this factor in its advertising.
JW: Part of the problem is that the general user doesn't understand multitasking. That's not their fault; it's our fault that they don't know about multitasking. And of course, to multitask effectively you need more memory and a faster processor.
JR: It's amazing how well you can multitask on a standard A500.
WR: It's amazing how quickly it slows down as well!
JW: It does depend on the application. A lot of software doesn't multitask properly, and will basically grab the system and slow everything down, and won't do what it's supposed to be doing. It's supposed to let the processor go; some of them say 'I'll just keep hold of it in case I don't get it back'.

THE BEST YEAR SINCE '85

AS: Where do you think we are in terms of the Amiga's development? Is this one of the most exciting years there has been since 1985?
JH: Yes, it's just starting now. For seven years the Amiga has been pretty static. Now in the space of say two years, we've got Workbench 2.04 which is a huge advancement, we've got 24-bit cards, 16-bit sampling cards, ARexx. Things are just starting now.
AS: Are you getting more value for your money now?
JH: That is the case with all technology, all sorts of things. The price of technology drops, but you still pay pretty much the same price for something, although the product is actually a lot better. It's like HiFI equipment.
JR: People think that Commodore has been totally static since 1985, and hasn't really done anything except new Agnus chips and new Denise chips, very minor changes.
JH: The enhanced chip set was designed in 1985. Jay Miner said that the chip set was done.
JR: The only problem was that the original designs for the original chips were lost. It's true! When it did the enhanced chips, Commodore virtually had to reverse-engineer its own chips and hack them, which is why the enhanced chip set wasn't a major re-build because it didn't have time. That's why it has taken it so long to do anything – because the original designs were lost.
WR: I'm disappointed. I would have thought that, after seven years, for a machine which at the time it was introduced was quite revolutionary...
JW: *Quite* revolutionary? It was stunning!
WR: What I would say though is that in the last seven years the competition might not have caught up but it has come damned close.
AS: Where has Commodore failed to seize the opportunities?
WR: It has failed to build upon what it has. It's failed to take advantage of the increase in graphic power.
JW: 'Failed' is probably the wrong word.
WR: It's failed to increase the processing speed.
JW: Ah, but the Amiga hasn't failed to sell.
WR: I'm not talking about sales this year or last year or the year before, I'm talking about the market-place that it is having to look at in the next five years.
JW: You can't use the words 'Amiga' and 'failed' in the same sentence!
WR: ...Commodore has failed to build on what it had, and all it's done is release a machine which is going to be the main seller for the next four years and which is really not that much better than the one it had seven years ago. And that's the sadness.
JW: I think we are forgetting that Commodore is a business and its ultimate aim is to make money.
JR: If it can't sell it then it'll change it, it'll make it better.
JW: For the last three years it has made all the right decisions. The A500 Plus is an exception; I think there's more behind that than can or should be talked about. I don't know if you can remember when it went from the A1000 to the A500, but everyone said 'crap machine – that's the end of Commodore'. It only lasted for about six weeks – exactly the same as people have said about the A600. I think you'll find that what will happen is that it will sell on the on-site maintenance – even though it's not needed!
MS: That's the great thing about it. Commodore has done a good thing.
JW: I think that's going to sell it, that and the low price – if it sells that means that the software and hardware houses will develop for it, and it will just go on from there. If it doesn't happen, then Commodore has to do something about it. But if it sells, why should it spend more money on something that may not sell? It's using a proven system.
WR: It depends on what your philosophy is. IBM's philosophy is that every year it will bring out a machine based on a processor that is twice as fast, and at a similar price. That's its business philosophy.
JW: But they're in different markets.
WR: It's still aiming to sell machines. My argument is that seven years on Commodore has produced another machine which is virtually identical to what it had seven years ago. That's the bottom line. I think it should have looked at something that's going to be the flagship for the next five years, that's got a chance of being more exciting.
GW: What we don't know is whether it has one up its sleeves or not.
WR: OK, but how many of you here thought 'Wow! what a great move' when they saw the A600? I bet most of you didn't.
GW: To me a machine like that is no use anyway, for what I do. But then I'm not a games player, I'm not in that market.
JW: We've been complaining about the A600 and saying it shouldn't be the base machine...
MS: It shouldn't be the base machine at £400. At that price you should be able to get a 16MHz '020 machine, with at least 1Mb. With surface mount technology Commodore could do that. The A600 would be fine as a base machine and then something like the A500 at £400 with a 16MHz '020 minimum could be re-introduced. Then we're talking serious competition with PCs.
JR: Traditionally Amigas have three machines: a low end, a mid-range, and a high range. That's not enough. If you look at PCs or Macs you've got a whole range of machines.
AS: Do you think Commodore will address that?
JR: We'll just have to wait and see.
AS: Well, I hope Commodore does it soon, because the Macs and PCs of this world are getting more powerful and less pricey by the day. AS

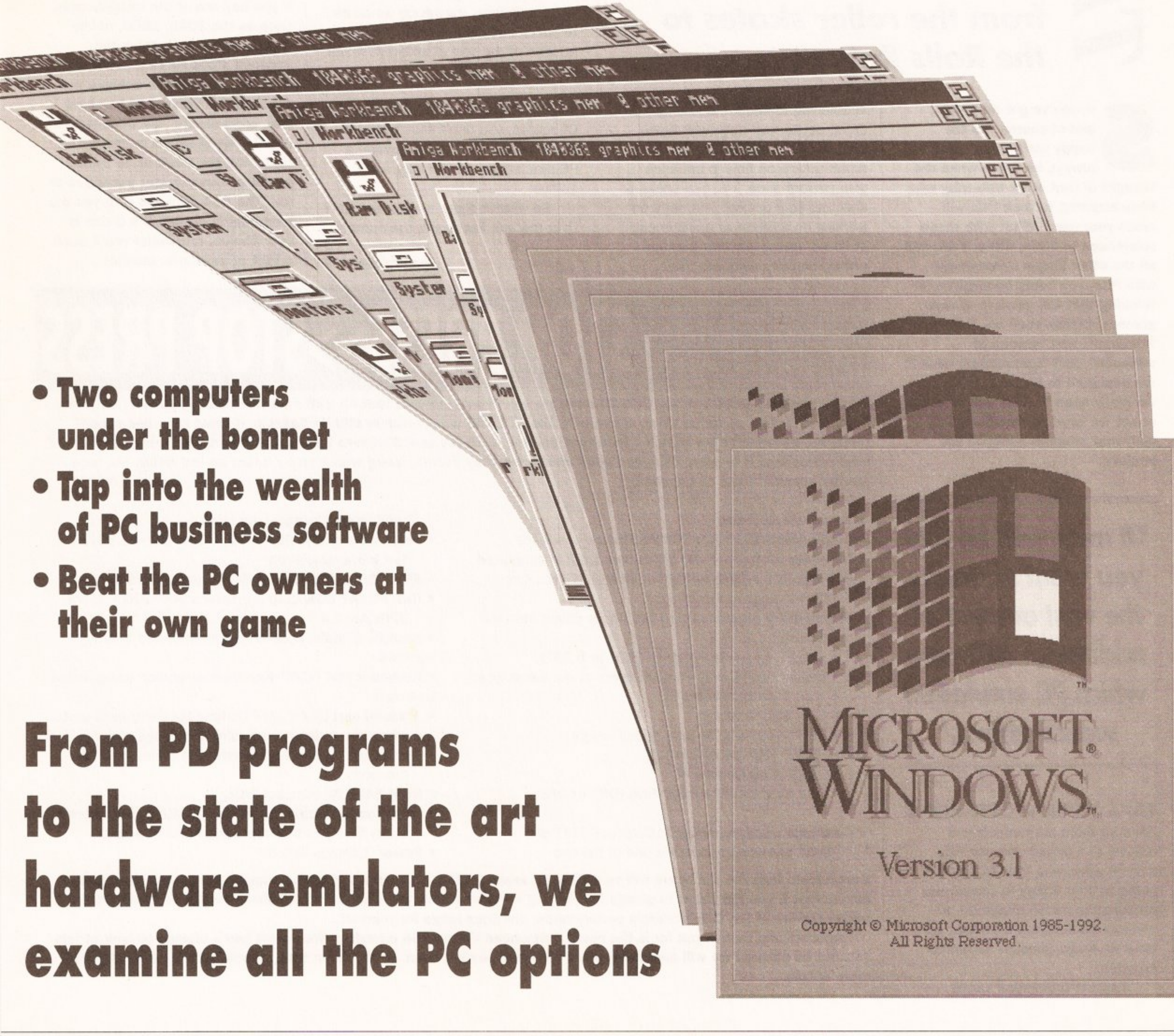


"But if you've got to spend £300 on an emulator and £700 on software, you might as well buy a PC"

Seeing blue?

Don't even consider buying a PC when you can turn your Amiga into one!

- Two computers under the bonnet
- Tap into the wealth of PC business software
- Beat the PC owners at their own game



From PD programs to the state of the art hardware emulators, we examine all the PC options

THE GREAT PRETENDERS

Want to take advantage of PC software on your Amiga? – With a PC emulator you can have the best of both worlds... Wilf Rees checks out the pick of the PC emulators, from the roller skates to the Rolls Royces

So, you've got an Amiga, and of course you are happy with it, but there will always be times when the thought of that other fraternity who keep referring to their PCs will cross your mind. What with those references to 386s, 486s, VGA, and all the other jargon synonymous with PCs, you could be forgiven for thinking that the grass is always greener. Claims such as, "Industry Standard", and "stacks of software", and "Commodore what?" are designed to impress, but what we really need to do is ask whether or not we want to emulate a PC, and what benefits doing so will achieve.

> **"It may well be that you want to access the vast amount of additional software which PC emulation would offer..."**

TAKE YOUR WORK HOME

I'm sure there are many of you reading this article who use PCs daily at work, who then troop off home to their Amiga to zap aliens, produce the parish magazine, re-orchestrate Debussy's *La Mer*, or write to *Amiga Shopper* for Amiga Answers.

A good PC emulator would enable you to keep ahead of the creep at the next desk who types with all 10 fingers and is full of smart advice on how to enhance your performance. You can sneak a disk into your pocket, and carry on working on a report or assignment at home, giving him that famous one-upmanship salute at the appropriate time.

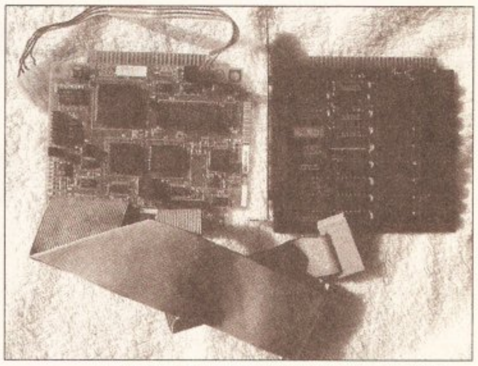
It may well be that you just want to access the vast amount of additional software which PC emulation would offer, or that you want to familiarise yourself with MS-DOS and the WIMP environment, rapidly expanding in the PC world. Certainly there are more PC users than Amiga users, and from someone who uses PCs regularly as well as Amigas, my advice would be to check out a PC, so you can have an idea of the sort of software which can be run on a PC.

SCANNING THE FIELD

Of course, you don't have to buy a PC to make use of the software, a PC emulator for your Amiga will suffice.

So what is there to choose from? Over the last few years, the number

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If you buy one of the bridgeboards, such as the 2088, 2086, or the Golden Gate, don't think the expense stops there... you'll also need plug-in cards to achieve the best results. Illustrated is a hard disk controller for the Commodore boards, along with a memory card to extend the 8088 up to 640K, enabling recent larger packages to run. The VGA card will give you the best quality output, but if this is your choice, remember you'll need a VGA or multisync monitor

STOP PRESS>>STOP PRESS

When I was researching this article Commodore would only indicate that its 386 card was nearing completion. When I informed it that, as far as I was concerned, the AT 2086 was therefore still its flagship, it must have had second thoughts, because in the post the following morning were the specifications for the new board, together with the information that it is being designed and manufactured by Vortex, along with a sister board for the A600. So, here are the specifications as supplied:

- **Processor** 80386sx
- **Clock speed** 16MHz or 20MHz (Choice of speed)
- **Coprocessor** Optional 80387sx coprocessor supported
- **Memory** Expandable to 8Mb on board (256K x 4 or 1Mb x 4 page mode ZIPS)
- **Floppy disks** Supports up to two floppy drives from the following:
  - One PC-only external drive (3.5" or 5.25")
  - One or two PC-only internal drives of the same type:
  - 3.5" 720Kb/1.44Mb PC
  - 3.5" 880Kb Amiga
  - 3.5" 880Kb/1.76 dual speed Amiga
  - 5.25" High density PC
  - 5.25" Low Density PC
  - One shared 3.5" Amiga drive (Df0: or Df1:)
- **Card type** Uses the Amiga (100-pin), PC/AT and PC/XT buses and occupies one of the two combination bridgeboard slots.
- **Video display** IBM PC/AT MDA Monochrome 80x20 text mode emulation
- **IBM PC/AT CGA Colour** 80x25 and 40x25 text mode
- **IBM PC/AT CGA Colour graphics** 640x200 x 2, and 320x200 x 4
- Multiple simultaneous displays supported in Amiga windows
- **Keyboard** IBM PC/XT Keyboard emulation using Amiga keyboard
- **Parallel port** IBM PC/AT Compatible Centronics port emulation (printer only) using the Amiga's parallel or serial port. Only one processor at a time may use this port.
- **ROM** 64Kb AT compact BIOS
- **Interprocessor communication** 128Kb shared memory, ability for PC to interrupt Amiga and vice-versa
- **Power** 2.5Amps @ 5.0V

Commodore tells me the board will be selling for around £250. This does add a new complexion to your decisions. I advise that if you are about to plunge into buying a PC emulator, you wait until a full-blown review can give you a better picture of the Commodore's performance, and then judge for yourself.

Another one to look out for is the newly announced Vortex 468 emualtor. We've not had a chance to look at this yet, but be assured we will and a full report will be appearing soon. In the mean time, check out the news pages for more details.

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B. BC-10MIA: 10MB RAM card for A500 w. Gary board. The biggest Ram card in the world. (only 8.7 cm × 12.3 cm)
C. BC-6MIA: 6MB RAM card for A500 w. Gary board (only 8.7 cm × 7.8 cm)
D. BC-2MIA: 2MB RAM card for A500 w. Gary board (only 8.7 cm × 5 cm)
E. BC-1MIA: Flexible 1MB RAM card for A500 with Gary board. Can be combined with extising 512KB card and our 2M, 6M RAM cards.

Basic RAM expansion

F. BC-1M1A+: 1MB RAM expansion for A500+.
G. BC-512MI & H. BC-512MIA: 512KB RAM card for A500

Efficient upgrading

I. BC-BS: Boot selector, No Mach-switch needed. Drive selection by mouse click.
J. BC-KS: Kickstart-ROM switch. Kickstart selection by keyboard.

Input and pointing

K. BC-SSP: Stereo sound sampler
Built-in amplifier. Switch for input source selection.
L,M, BC-TKI/BC-TKP: Tracker Pen for IBM PCs and Amiga/Atari. Can be used as Pen-mouse or Mini-Trackball.
Resolution: 250 dpi on Atari/Amiga
50-1250 dpi on IBM PCs and compatibles.
N,O,P,Q, BC-MS1/BC-MT1/BC-MS2/BC-MS3: Mouse and Trackball for Amiga, Atari, IBM PCs and compatibles.

Video Devices:

R. BC-TVM:TV RF-modulator with sound input
S. BC-GLK:Genlock for Amiga Computer

Bus converter

T. BC-520CV: Bus converter for A500/A500+
Expansion slot for A500/A500+ to use A2000 interface
AT Bus slot for bridge board
86PIN pass-through Bus for A500/A500+ interface.

- **Full 1 year warranty.**
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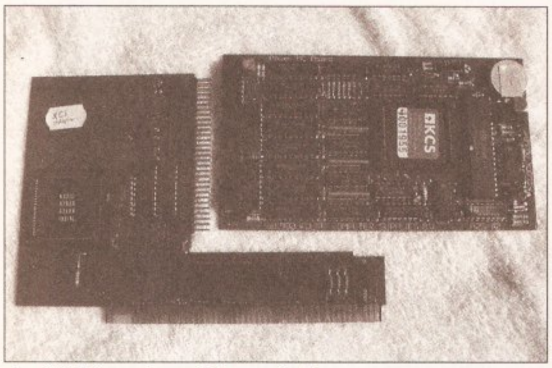
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of options has grown considerably. These options fall into two distinct categories, software based emulators, and hardware *and* software emulators.



The KCS Powerboard: if you don't have a GVP hard drive, and you don't fancy taking your Amiga to bits, then this is the one. It simply plugs into the expansion slot under your A500, or, with the adaptor shown in the picture, fits into the A2000/A3000

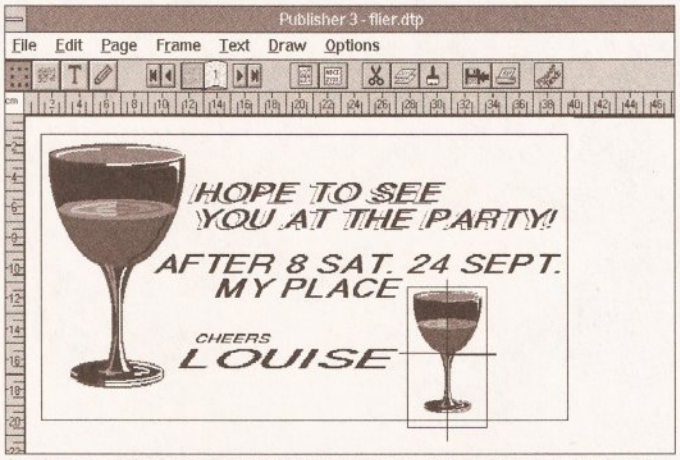
THE SOFT OPTIONS

The software-only options worth addressing are: *Transformer*, *IBeM* and *PCTask*. The two former packages are both available in the public domain whereas *PCTask* is licensed to Chris Hames.

Transformer is by far the most popular of the two PD packages, originally released by Commodore, but so dreadful that it took several revisions by capable users to make it anything near acceptable. *Transformer* is a PC-AT emulator with a Norton system info benchmark of 0.2 on a basic Amiga 500. It's cheap and cheerful, but tediously slow, only supports MDA (monochrome), doesn't have hard disk support, mouse support or sound support, and there is no documentation. It is really only suitable for text processing and DOS operations. To be honest, I got a little fed up with it crashing too often, but, you pays yer money...

> "... forget any of the disk-based options unless time is of no concern."

IBeM is marginally more stable than *Transformer*, and clocks in with Norton a shade faster at 0.3. MDA and CGA screen modes are supported, and linked with *MessyDos* (PD MS-DOS filing system), it enables your Amiga to access and write to PC formatted 720K disks. I prefer *IBeM* to *Transformer*, but it really is very slow on screen updating, and offers the same limited support for peripherals as *Transformer* does.



Desktop publishing with the KCS Power Board. Unfortunately there's no genuine VGA colour, due to the ISA bus not being supported on my A2000. A shame really, as this is a good value for money card which gave virtually no problems

PCTask is in quite a different category to the other two, reflecting its license status, rather than PD. It has a Norton benchmark of 1.8 on the Amiga 3000, 0.4 on an Amiga 500. CGA and MDA support are provided, along with hard disk, serial and parallel ports and mouse support. Sound is not supported. I had no compatibility problems, and *PCTask* took advantage of the G Force 030 accelerator in my 2000, speeding it up considerably. *PCTask* is also capable of multitasking, offering you the chance to move back and forth between your Amiga and PC software. *PCTask* is definitely the best choice of the three software options, and extremely well supported with read-me documentation. But even *PCTask* is laboriously slow, and if you are considering any kind of graphics emulation, I think you can really forget any of these disk-based options, that is unless time is of no concern.

> "If you really want to explore the possibilities of PC emulation... look at the hardware and software combinations..."

If you want to really explore the possibilities of PC emulation, then the best option is to look at the hardware and software combinations on the market.

HARD AND SOFT OPTIONS

The choice is growing, but there are still only a few to consider: KCS PowerBoard, AT-Once, Commodore A2088 PC-XT Bridgeboard, Commodore A2286 PC/AT Bridgeboard, GVP HD8+PC286, Vortex Golden Gate 386sx.

Of the six mentioned, they do not all fall as automatic options. KCS and AT-Once fit into the Amiga 500 and A500 Plus; the A2088, A2286 and Golden Gate only go into an A2000 or A3000; and the GVP is suitable only to owners of a GVP HD8+ or A530 hard drive for an Amiga 500. There is an adaptor available for the KCS which enables the unit to fit into an A2000 or A3000, but this is an optional extra.

GOING DUTCH

KCS got in first with the PowerBoard as the earliest PC emulation card for the Amiga 500. Its biggest advantage over the AT-Once is that installation couldn't be easier: open the RAM expansion slot in the base of the 500, plug in and the process is complete.

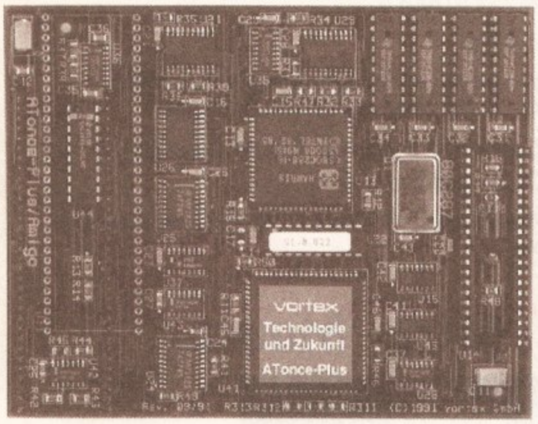
Specifications claimed are impressive: 704Kb of memory in MDA/CGA, 640Kb in CGA/VGA, 200Kb extra memory (MS-DOS RAM disk for example), 512K Fast RAM plus 512K RAM disk for normal Amiga use, a real time clock, an 11MHz clock speed which can be slowed down if required, a software flicker fixer in PC interlace mode, a mouse driver compatible with the Amiga mouse plus a pause facility.

AMIGA SHOPPER'S DEFINITIVE PC EMULATORS GUIDE

EMULATOR NAME	EMULATOR TYPE	CPU TYPE	CPU SPEED	NORTON SI	RUNS WINDOWS 2?	RUNS WINDOWS 3?	LANDMARK SPEED	FPU SUPPORT	USE AMIGA DRIVE	USE AMIGA MEM?	MEM ON BOARD	MDA
Transformer	Software	–	–	0.3	No (too slow)	Not at all	–	–	Yes	–	–	Yes
IBeM Software	Software	–	–	0.3	No (too slow)	Not at all	–	–	Yes	–	–	Yes
PC-Task	Software	–	–	0.3	No (too slow)	Not at all	–	–	Yes	–	–	Yes
Powerboard	Hardware	NEC V30	10.4MHz	4.6	Yes (a bit slow)	Very slowly	3.5	No	Yes	Yes	Yes (512K)	Yes
AT-Once	Hardware	80286	7.14Mhz	7.6	Yes (a bit slow)	Yes (slowly)	8.7	No	Yes	Yes	No	Yes
AT-Once Plus	Hardware	80286	16MHz	17.2	Yes	Yes	15.4	Yes	Yes	Yes	No	Yes
PC286	Hardware	80286	16MHz	17.2	Yes	Yes	15.4	Yes	Yes	Yes	Yes (512K)	Yes
A2088	Hardware	8088	4.77MHz	0.8	Yes (very slowly)	No	–	Yes	No	No	Yes (512K)	Yes
A2086	Hardware	80286	8MHz	6.6	Yes (fast)	No	9.4	Yes	No	No	Yes (1Mb)	Yes
Golden Gate	Hardware	80386sx	25MHz	23.3	Yes	Yes (multitasking)	28.4	Yes	Yes	Yes	512K exp to 216Mb	Yes

This is all available with MS-DOS/GW Basic/Shell/DOS help and PC function key emulation.

All this sounds pretty impressive, but how well does it perform? Getting up and running was a doddle. A short boot routine selects the video mode, disk drives assigned and any peripherals attached, and then you're off.



Vortex AT-Once Plus: buying this one depends on whether you want to invalidate your warranty and get into dismantling your A500. A pig to fit, and I suffered too many crashes. Perhaps it was me at fault, but unplugging CPUs and all that business is not for the faint-hearted

A point worth mentioning here is that the KCS does not work with the ISA bus in the A2000 or A3000, so additional PC cards are of no use for expanding your system. You can configure the KCS to use either the Amiga internal floppy or external floppy as a PC drive, internally as a 720K 3.5", or externally as the same or as a 5.25". Unfortunately this configuration only works in PC mode; in Amiga mode a DOS transfer utility such as *DOS-to-DOS* is required. The KCS really performs best when a hard drive is attached to your Amiga. A partition on your drive will allow PC data on one half and Amiga data on the other.

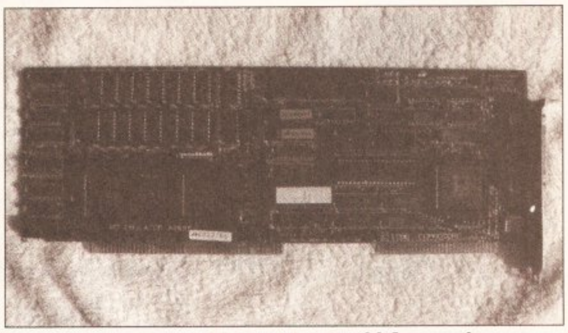
In action the KCS proved faultless, handling *Windows* adequately if somewhat slowly. Text handling was excellent, speeds of screen refresh were a match for most 286 machines I have used. It isn't until the real test of graphics-intense applications is pushed that the KCS starts to wobble. *F29 Retaliator* for the PC really was a labour, and the utilisation of the NEC V-30 8/16-bit processor on the KCS, as opposed to the slower Intel 8086, still failed to achieve sufficient speed from the Amiga to make the flight-sim. smooth. *Deluxe Paint II Enhanced* for the PC was beautiful – using a multisync monitor gave a completely new perspective to tonal gradation. The difference in resolution alone is worth the money.

KCS is a good piece of kit, superbly made and easy to use. Disk access is remarkably fast. A nice inclusion is the help screen which enables configuration changes to be carried out at any time. I've only two criticisms really – firstly the graphics update gets rapidly slower proportional to processing; secondly, a minor but irritating point: if you require an on/off switch, you have to set about the board with a soldering iron, some cable, and a switch of your own choosing.

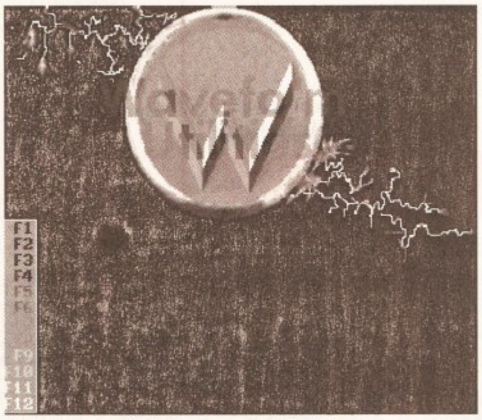
> "Warranties are invalidated if the silver seals around your machine are broken..."

A GERMAN LADA

Like the KCS, the AT-Once is designed specifically for the Amiga 500, but installation is a completely different ball-game. If your A500 is still under warranty, you have a problem. Those among you faint of heart at the thought of removing the screws from your Amiga and dismantling it, *take note*, because fitting the AT-Once is a swine! Warranties are invalidated if the silver seals around your machine are broken, and this is just what you must do to fit it. Off comes the lid, off comes the metal shielding, out comes the keyboard, out comes the Gary chip, out comes the 68000 processor... Getting worried? There's more! My advice before you start is to look at the 'Read-Me' file on the support disk, which gives further instructions beyond the small but reasonably concise instruction manual. Fitting of the AT-Once is basically a reversal of this procedure, but some A500s require the installation of the enclosed Gary module in order to make everything fit. Unfortunately this module can cause some A590s to cease working, so *be warned*.



My own trusty old Commodore A2088. It may be laboriously slow, long in the tooth, and ancient technology, but it never fails, works with everything I throw at it, and has worked constantly without fault for several years



No, I know what you are thinking, but just to be a smart-ass, this is *DPaint II Enhanced* on the PC, using the old XT bridgeboard. You think grabbing brushes in HAM with *DPaint IV* is slow? You want to try the XT, it just takes ages, but at least it does get there eventually...

More importantly, if you have an older machine, check out the revision number on the main motherboard. Revision 6a is what you don't want to find, because the AT-Once will not work with that version unless you carry out a motherboard modification requiring the soldering of a wire across resistor 106 (labelled on the board as R106).

Well, the board is installed, and it looks really neat and compact. Unlike the KCS which is 8-bit, the AT-Once sports an Intel 80286 16-bit processor running at either 8 or 16MHz. The choice is up to you.

The two versions are known as the AT-Once Classic, 7.2MHz with a Norton rating of 7.6, or the AT-Once

continued on page 29

AMIGA SHOPPER'S DEFINITIVE PC EMULATORS GUIDE

Herc	CGA	EGA	VGA	Olivetti	Multitasks?	HD Support?	ISA Bus support?	Ports supported	Installation/10	Documentation/10	Compatab/10	For which Amiga?	Price	Overall/50
No	No	No	No	No	No	No	–	LPT1, COM1	–	0	5	A500	PD	10
No	Yes	No	No	No	Yes	No	–	LPT1:, COM1	–	6	6	A500, A2000	PD	14
No	Yes	No	No	No	Yes	Yes part or file	–	LPT1, COM1+2	–	9	8	All	£40	18
Yes	Yes	Yes	Yes	No	No	Yes part or file	No	LPT1, COM1+2	9	5	10	All except 1000	£189	35
Yes	Yes	Yes	Yes	Yes	Yes	Yes part or file	No	LPT1, COM1+2	3	6	6	A500, A2000	£139	25
Yes	Yes	Yes	Yes	Yes	Yes	Yes part or file	No	LPT1, COM1+2	4	7	7	A500, A2000	£240	30
Yes	Yes	Yes	Yes	Yes	Yes	Yes part or file	No	LPT1, COM1+2	8	8	8	A500 with GVP	£229.95	38
No	Yes	No	No	No	Yes	Part, file or Hcard	Yes, XT (8-bit)	LPT1	8	9	9	A2000, A3000	c.£150	26
No	Yes	No	No	No	Yes	Part, file or Hcard	Yes, AT (16-bit)	LPT1	7	9	9	A2000, A3000	c.£350	38
Yes	Yes	Yes	Yes	Yes	Yes	IDE on card, Amiga, ISA Card	" "	LPT1+2, COM1+2	6	8	9	A2000, A3000	£499	46

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Touch UP and Merge It Software £119.95

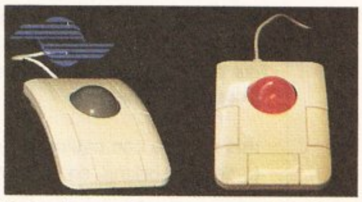
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Touch UP , Merge It and Special OCR software.

Minmum system requirement 2Mb RAM, and a Hard Disk

£199.00

Trackballs



GOLD AWARD WINNER IN ST FORMAT 92%

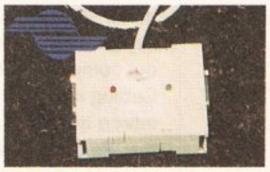
Stylish three button trackballs, with third button supporting auto fire and drag and hold

ST REVIEW 91%

£29.95

With two colour shining Crystal Ball £34.95

Auto Mouse/ Jostick Switch



St Format 78%

Automatic Switcher between two input devices with a click of a button. E.g. mouse/mouse, mouse/joystick, joystick/ joystick.

£12.95

Mega Mouse



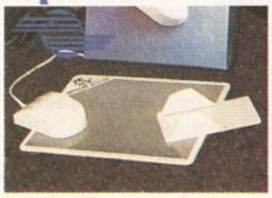
GOLD AWARD WINNER IN AMIGA FORMAT 90%

A 290 dpi high resolution Opto-Mechanical Mouse. Top quality construction ensures rapid and smooth movement, with micro switch buttons.

Mouse only £10.95

Mouse with hard mat and mouse holder £14.95

Optical Mouse



St Format 81%
Cu Amiga 79%

Superb 300dpi Optical Mouse with effortless micro switch buttons. Fast, smooth and reliable.

Includes Optical Mouse Pad and Holder

£26.00

Optical Pen Mouse



A stylish Pen Mouse with quality construction and smooth fast movement. Micro switch buttons.Ideal for DTP,artwork,etc

Includes Optical Pad

£35.95

Cordless Infrared Mouse



Cu Amiga 81%

Remote control mouse, long working distance. Long life rechargeable battery. 260 dpi.

Includes Hard Mouse Mat.

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GOLDEN IMAGE

GoldenImage Mouse with Mat £ 13.95

GOLD AWARD WINNER IN AMIGA FORMAT 90%

The Brush Mouse with D-Paint. £ 19.95 St Format 88%

ICD Products

AdRAM-2080(2 Mb RAM)	£139.00
AdRAM-540(4 Mb RAM)	£209.00
AdSCSI 2000 w/LPS105S	£405.00
AdSpeed	£129.00
AdSpeed/IDE-40	£229.00
Flicker Free Preference	£ 19.00
Flicker Free Video 2	£195.00
KickBack ROM Switcher	£ 19.00
Novia 60i	£359.00
Novia 85i	£449.00
Novia/AdSpeed 60i	£499.00
Novia/AdSpeed 85i	£599.00
Prima 105i	£429.00
Prima 120i	£445.00
Prima/AdSpeed 105i	£579.00
Prima.AdSpeed 120i	£599.00

1Mb RAM with Clock A600	£ 49.00
1Mb RAM without clock A600	£ 45.00
512k RAM with clock A500	£ 25.00
1Mb RAM for A500+	£ 39.00
Kickstart Switch	£ 14.95
Bootselector Switch	£ 9.95
Power Supply for A500	£ 34.95
3.5" External Drive	£ 49.00
1Mb Simms	£ 25.00
2-8 Mb RAM for A2000/A1500	£129.00
Power Scanner	£ 95.00

Hard Drives

A500/A500+

52 Mb RAM Upgradeable	£329.00
105 Mb RAM Upgradeable	£399.00
210 Mb RAM Upgradeable	£519.00

A1500/A2000

52 Mb RAM Upgradeable	£299.00
105 Mb RAM Upgradeable	£379.00
210 Mb RAM Upgradeable	£499.00

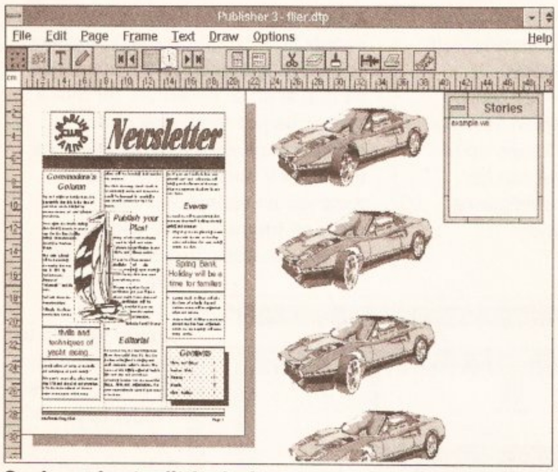
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Plus 16MHz with a Norton rating of 17.2. Principal differences apart from the clock speed are that the 'Plus' has 512K on-board memory configurable as PC or Amiga Fast RAM and that it has a slot to fit an optional 80287 maths co-processor. The classic has neither of these.



So, how about a little desktop publishing with a Commodore AT 2086 card? No difficulty encountered, but it really is making the old 286 processor heat up trying to move graphics around at this rate of knots

So how did it perform? Erratically is the only reply: it crashed too often, and while being reasonably fast, I wouldn't like to be in the middle of an important document only to find work lost.

I ran a module player as a background task, it crashed. I started a ray-tracing program as a background task, it crashed. I went back and checked the CPU installation to ensure the 68000 was properly seated – it was. I put it back together, it worked, for 10 minutes and then it crashed again. I got fed up here, speed tested it again, and decided to remove it altogether.

ON AND ON AND ON

Commodore makes good kit as we all know, and the A2088 PC Bridgeboard is a superbly engineered and extremely reliable emulator for the A2000 and A3000. The package comes complete with a 5.25" drive to be mounted in the front bay of the computer. A second drive port is located on the rear of the card suitable for a 5.25" 360K or a 3.5" second drive. The card uses an Intel 8088 processor running at 4.77MHz, although most users of the XT board know that the best way to improve performance is to chuck the Intel chip away and replace it with an NEC V20, costing about £15 and giving noticeably better performance. As with its bigger brother, the XT is fully multitasking with the Amiga. There is space on the board to fit a maths co-processor, giving much improved performance on number crunching activities, and the support for the ISA bus enables users to add additional cards such as VGA graphics and extended memory cards to extend the capabilities beyond the CGA and 512K limitations. An on-board hard disk interface allows users to attach a hard disk directly to the XT board. There is no support for the Amiga's own disk drives, and whilst the parallel port is supported, the serial port is not. You can however partition the Amiga's hard drive and share space with the Amiga. Unfortunately the card does not share the Amiga's memory, so larger software packages need additional memory to enable them to run, and there is no space available on the board to extend this. The mouse is supported, as is sound, but this requires a connector, two short wires and a speaker to make it function – a task fairly easy to achieve.

I have owned an XT card for several years, using a VGA card and an extra memory card. I have never found any PC software that doesn't work. Seems like the ideal solution, especially as the whole lot can now be picked up for around £200.

So what's the snag? Dead simply, speed. The XT Bridgeboard is very reliable, beautifully made, but pathetically slow. Norton System Info gives 0.8. That means it works at 0.8 times the speed of a bog standard IBM XT, and believe me that is *slow*! Perhaps it was acceptable years ago when Commodore first started to manufacture the board, but now it really is snail-paced. Text is still reasonably acceptable, but graphic applications rapidly grind to a halt as the Amiga tries to cope with the aged performance of the old processor. Even using my accelerator at 30MHz, it's tedious. Running Microsoft *Windows* is almost like ray-tracing, and hard disk activity is almost cup of coffee time.

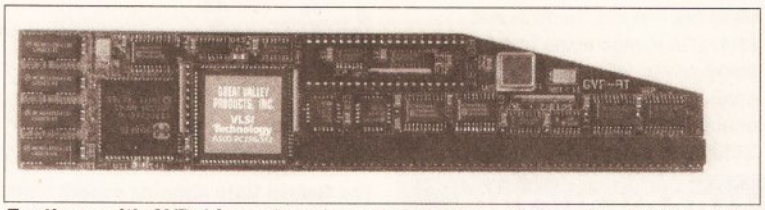
"...graphics applications grind to a halt as the Amiga tries to cope with the aged performance of the old processor."

286 FOR PRICE OF A 386

As well as the XT Bridgeboard for the A2000 and A3000, Commodore also produces the PC/AT 80286 Bridgeboard for the same machines. This differs from the former in several respects, principally cost, in that the card is ludicrously over-priced.

Commodore has a 386sx card in beta version, with which it intends to replace both the XT and the AT, but despite promising me a look, this didn't materialise. So knowing Commodore as I do, sorry Kelly, but this is currently your flagship emulator, and considering a punter can buy a complete stand-alone 386 including 100Mb hard drive, VGA monitor, DOS 5 and *Windows 3.1* for around £750, I can only say that at £575 this board is a joke. The truth is, however, that dealers or wholesalers are making a killing, because Commodore sells the board at *considerably* less than this!!

What does all this money buy you? Well firstly the processor is an Intel 80286 running at 8MHz. (Again this is best changed, this time for the NEC V30, to give improved performance.) There is an empty space to add the optional maths co-processor, and a 5.25" 1.2Mb floppy is included in the package. Support for the ISA bus, Amiga mouse, parallel port, internal hard drive and so on is the same as for the XT board. The principal differences are that there is no external drive connector to the rear of the card, and that on-board memory is extended to 640K. The board works well, and shows a distinct improvement over the XT.



For those with GVP drives, there is really only one solution – the PC 286. AT performance, ease of fitting, and well behaved in trial. Highly recommended!

Text handling is very fast indeed – it takes quite a burst of graphics activity before the inevitable bottleneck of calculations starts to jam things up.

Fitting of the AT card is identical to that for the XT. It requires removing the lid from the machine. The blanking plate to the rear of one of the Zorro slots is removed, and the card is simply pushed into place, bridging with the ISA bus to provide the extended options. The blanking plate for the 5.25" drive is removed from the front of the computer case. The drive is then bolted into place using the spacers and bolts provided. The 3-pin connector on the computer wiring harness is plugged into the drive, the ribbon cable from the drive connected to the card, lid replaced, and once switched on, installation of the PC emulation software can begin. The 'Janus' installation package is very easy to use, and offers all the usual facilities for system configuration.

Manuals for both the XT and AT card are excellent, and very user-friendly. It's a great shame that Commodore didn't offer these two pieces of kit at affordable prices when they were first released, firstly because they are excellent in both design and reliability, but more importantly, it would have encouraged more people to buy 2000s, more people to buy Bridgeboards, and encouraged Commodore to get a better replacement on to the market-place, avoiding the drift of Amiga users who are changing to PCs.

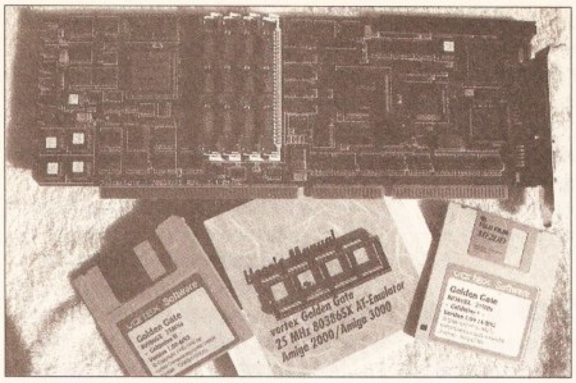
PLUG IN, PLUG IN

Lining up nicely with our collection of emulators is a somewhat unique offering for those of you out there who own the much acclaimed GVP HD8+ or the A530 Amiga 500 hard drives.

Both of these drives, which plug into the edge connector of the A500, share a 'Mini slot' internally, which will enable you to expand the system without having to extend the 'pass through' limitation.

The other advantageous and obvious feature is that there is no invalidation of your computer's warranty. The PC286 runs at a crisp 16MHz, and has on-board space to fit a 287 co-processor.

On-board there is 512K of PC RAM plus the use of Amiga RAM to extend memory. Hercules, CGA and Toshiba T3100 video modes are supported, but unfortunately EGA and VGA are only accessible in monochrome. All of the Amiga's facilities can be called on for use – all ports, drives and interfaces – and the card allows full multi-tasking with the Amiga.



The Golden Gate: this really is a beautiful piece of kit. It went straight into my A2000 and worked like a dream. Construction of the multi-layered board is of the highest order. The software is easy to follow, and the documentation OK. It's rather expensive, and the basic lump really is inadequate without the additional 'extras' which I think should be included in the price

VORSPRUNG DURCH TECHNIK

There are PC cards, emulators, software, and there is the Golden Gate...

New from Vortex, the makers of the 'not so hot' AT-Once, is Golden Gate – a completely different animal, because Golden Gate is a beast!

Looking at the card itself, it is a full width PC size card, 6-layer sandwich, with the initial appearance of having been manufactured to an extremely high level of competence.

Before talking about performance, let's just list the impressive specs.

The Golden Gate is a 25MHz 80386sx CPU card which fits into the A2000 or A3000.

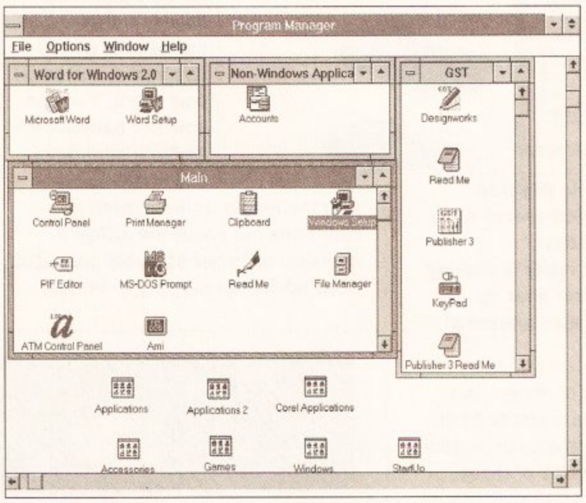
The card bridges the ISA and Zorro slots allowing extension of the

> ***"The Golden Gate is a beast!"***

supported 6 colour CGA and Hercules, Olivetti, Toshiba and EGA/VGA monochrome into full blown colour VGA. (Additional PC cards can obviously be added to enable the use of LAN controllers, SCSI host adaptors, you name it.)

Flicker fixing cards are supported, as are '020, '030, and '040 accelerators. There is an integrated 386sx chip set and an AT compatible BIOS with enhanced 386 functions. The Amiga mouse is emulated as a serial Microsoft mouse, and the Amiga keyboard works as a PC keyboard. There is also a built-in speaker, real time clock, and CMOS RAM.

512K of on-board RAM can be extended with 32-bit SIMM sockets in 256K, 1Mb or 4Mb lumps up to 16Mb. 4Mb of this RAM can be configured as an auto-configuring Fast RAM expansion under AmigaDOS.



The Golden Gate showing superb form with *Windows*. It's as fast as the PC I use, and shows no problems at all with disk handling. If you have the dosh, this package really is a beauty. Pity some of the necessary equipment, such as the disk controller chip, comes as an extra

The rear of the card hosts two ports, an external floppy adapter capable of reading high density 1.2Mb, 1.44Mb and 2.88Mb disks, along with an optional connector for future developments.

All memory above 1Mb can be used as extended or expanded memory. Individual assignment of MS-DOS partitions can be achieved either as a file within an AmigaDOS partition, or with a complete partition as an MS-DOS partition. Up to 24 MS-DOS partitions can be installed. MS-DOS can be booted directly from any one of these. All versions of MS-DOS from 3.2 upwards work successfully, as well as *DR-DOS* 5.0 and 6.0.

All adds up to a pretty extensive collection of specs, but what does the translation into practice produce?

Fitting the board was relatively difficult. Among the kit supplied with Golden Gate is a CPU adapter.

This has to be plugged into the 68000 socket on the motherboard, then the 68000 plugged into the adapter. This is a fiddly process which involves removing the metal supporting frame taking up the power supply and internal floppies. Correct antistatic precautions are essential, as is a spirit of adventure for those among us not too happy about levering expensive microprocessors out of their sockets. After you've removed an appropriate blanking plate on the rear of the computer, the Golden Gate then simply plugs into one of the Zorro slots, in similar fashion to the Commodore XT and AT cards.

I must however be getting close to the power supply starting to groan – A2000 users like myself, who slowly fill up the various slots, need to take heed. Apart from the obvious power consumption, the three hard drives, accelerator card, motherboard and other assorted goodies all contribute to an alarming amount of heat – fitting an additional cooling fan would be a wise precaution. That aside, the software set-up routines worked smoothly from the 'GOLDMINE' disk set provided... and off we went.

Initially I connected the Golden Gate to the ancient Amstrad ST506 8-bit hard drive I normally use with my XT card. Splendid! the old devil burst into life, and within seconds, there was PowerMenu. Onwards, and into *Windows*. The performance of this card is faultless. It was working in VGA through my Compaq VGC VGA card without batting an eyelid – data processing from the hard disk was vastly improved.

> ***"Correct antistatic procedures are essential, as is a sense of adventure..."***

Impetuosity got the better of me now, so off I shot to my local dealer, Microtec, and after a little sweet-talk managed to swiftly return to my A2000 complete with a scrounged IDE 40Mb hard disk. Fortunately the hard-disk was ready loaded with

continued on page 32

JARGON BUSTING • JARGON BUSTING

MDA – Monochrome Display Adaptor displays monochrome text only.

Norton Rating – A method of comparing relative speeds of different PCs. The old PC XT is rated at 1; speeds of others are given as multiples.

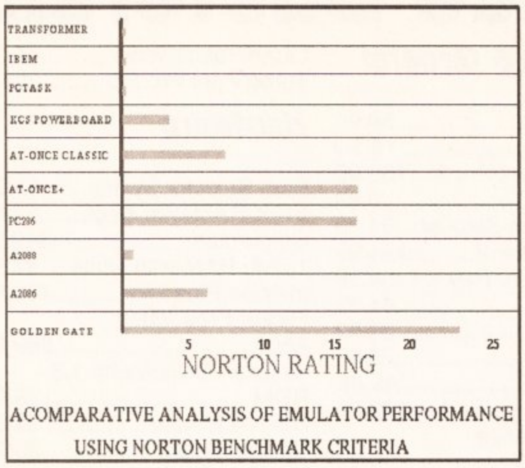
Hercules – This is a graphics adapter which is very similar to MDA, with the small difference that it can support graphics.

CGA – Stands for Colour Graphics Adapter. This type of adapter enables a PC to display in colour, with up to 16 colours of text, or up to 4 colours in graphics with a resolution of 320x200 or 2 colours with a resolution of 640x200.

EGA – Enhanced graphics adapter. This graphics adapter allows much greater graphics power than a CGA card, supporting up to 16 colours with a resolution of 640x350.

VGA – Video graphics array. This is the most popular of the graphics adapters in the PC world, currently the flagship of PC graphics. It allows more memory to be fitted to the card (Super VGA) to enable a maximum display of 256 colours out of a palette of 256,000 with a resolution of 1024x768. This might all seem very nice, but any software emulation of this adapter on an Amiga would have to have its wings clipped. The Amiga can only display 16 colours at its highest resolution (640x512). Normal VGA allows a maximum resolution of 640x480, so this is all the software emulations will support.

XT – This type of computer is an old design of PC which employs the following processors – Intel 8088, NEC V20. Although 16 bits internally, these particular processors can only talk to the outside world in 8 bits, unlike the Amiga's 16 bits. This means that memory access and video processing can be very slow. Also the clock speed of these processors are low (under 10MHz).



A graphical representation of the comparative speeds of the emulators I have looked at in this article. You really do appreciate the difference between the software emulators and the combination kits

continued from page 30

software, so off with the lid to find a suitable space amongst the chaos, connect up to Golden Gate interface, back together – Wow! The speed is phenomenal. Disk access and processing makes the 386 I use at work look positively tame. Everything works without the slightest hitch.

Norton Utilities sees a comparative performance: Benchmark 23.5, approximately 24 times faster than my XT card, even rivalling the speed of my Amiga using the GVP '030 card. *Word for Windows* positively flies, and *F29 Retaliator* is as smooth and crisp as anything I've seen short of a 486.

I have yet to find anything that will not work with Golden Gate. If you want the Rolls Royce of cards that performs like a Ferrari, this is without doubt the one! I wonder if Silica will notice if I don't send it back?

SUMMARY

Which emulator is most appropriate for you is really dependent on several factors. You should ask yourself the following questions...

- Do I have an A500, or an A2000/A3000?
- Do I own a GVP HD8+ or an A530?
- Do I want text only, or text plus graphics?
- How much cash do I have?

A500 owners who do not have a GVP drive, and only want text handling, need look no further than *PCTask*; it is multitasking, cheap, and adequate, although a little slow. Second choice, *Transformer*.

For A500 owners who don't have a GVP hard drive, don't want to start taking their Amiga to bits, need text and graphics, the KCS is the simple answer – just plug into the trapdoor slot and go. Text handling is fine, graphics a touch slow. AT-Once would be my final choice, but a lot of hassle, and for me, unstable.

A500 owners who do have the appropriate GVP drive, then unquestionably the GVP (Vortex) PC286 is the best option. It's stable, fast and quickly installed. The PC286 is also reduced in price to £199 making it an even more attractive.

For A2000/A3000 owners who require text only and whose funds are limited, *PCTask* is the one. If graphics are also needed, check out discounts on the Commodore AT 2086 bridgeboard. Prices will fall rapidly when Commodore announces the price and specs of its new 386 cards – the AT is a reliable and well made performer, and no slouch. The XT card is a possibility. Now as prices on this discontinued unit drop to as little as £150 it is worth considering, but it is really slow, so be warned. The KCS will slot into both high-end Amigas, but it needs an adaptor board which isn't cheap – and remember the KCS does not support the ISA bus.

Golden Gate is a superb performer, beautifully made and *very* fast, although not exactly cheap. But,

> **"Golden Gate is the Rolls Royce of the cards and performs like a Ferrari..."**

386 is now accepted as the entry level in the PC world, so there will be continued hardware and software support, and manufacturers are producing packages that exploit this level of technology to the full.

These are my findings, the choice is yours. AS

ACKNOWLEDGMENTS

My grateful thanks are due to the following who made time and equipment available for my use:
David Bell at Microtec of Morpeth, Vortex in Germany, Bitcom Devices of Gateshead, 17-bit Software of Wakefield and Red Dragon Shareware of Rhyl.

JARGON BUSTING • JARGON BUSTING • JARGON BUSTING

AT – This is the second generation of PC computers which employ faster processors and even address memory in 16 or 32 bits. The processors involved are the 80286, '386 and '486. These can be clocked at anything up to 66MHz and can be up to 70 times faster than a slow XT.

ISA Bus – (Industry Standard Architecture) This is the place in a PC into which all the expansion cards are plugged. It is rather similar to the Zorro slots on an A2000 or A3000. If you've ever opened up an Amiga 2000, you will see on the top left-hand area of the motherboard that there are a few extra expansion sockets. This is an ISA bus. An XT PC, using the ISA bus, will communicate with expansion cards in 8 bits per data movement, where an AT will communicate in 16 bits. Occasionally, '486 PCs will have EISA buses (Extended Industry Standard Architecture). This allows the processor to communicate with expansion cards in 32 bits per data movement.

BIOS – A BIOS in a PC is, in effect, the ROM. It controls the way in which the PC operates. You may also find BIOSs on expansion cards on the ISA bus. A VGA card, for instance will have a BIOS, controlling the way that it operates.

Shadowing – This procedure copies all the information of the PC BIOSs to Fast PC memory, either on the PC itself or on expansion cards, to enable lightning fast operation. For instance, if you shadow the BIOS on a VGA card, the screen update improves dramatically. This only applies to hardware emulators.

LPT1 – This is the parallel interface of a PC. The Amiga equivalent is PRT:. The number afterwards is the number of the interface if your PC has more than one.

COM1 – This is the serial interface of your PC, with the AmigaDOS equivalent being SER:. Once again, the number afterwards is the number of the interface if your PC has more than one.

FPU – Floating Point Unit. This is another name for the maths co-processor that does all the number crunching activities on your computer.

Expanded memory – When PCs were first thought of, they were limited to being able to address 640K of memory. Expanded memory provided a way round this, but due to the versatility of extended memory, expanded is not as popular as extended.

Extended memory – This is memory above 640K on 80286 processors and above. It is used by more applications than expanded memory is. This type of memory is usually faster than extended.

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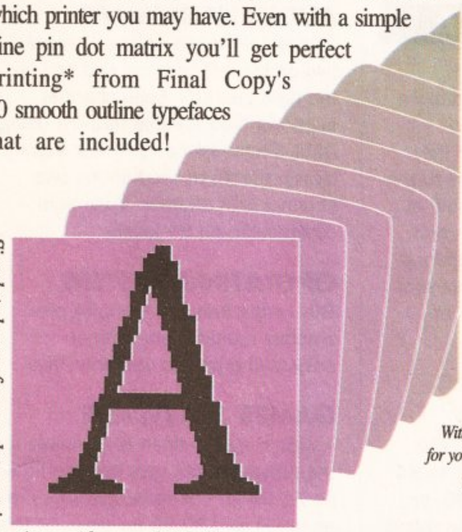
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THE FINAL WORD

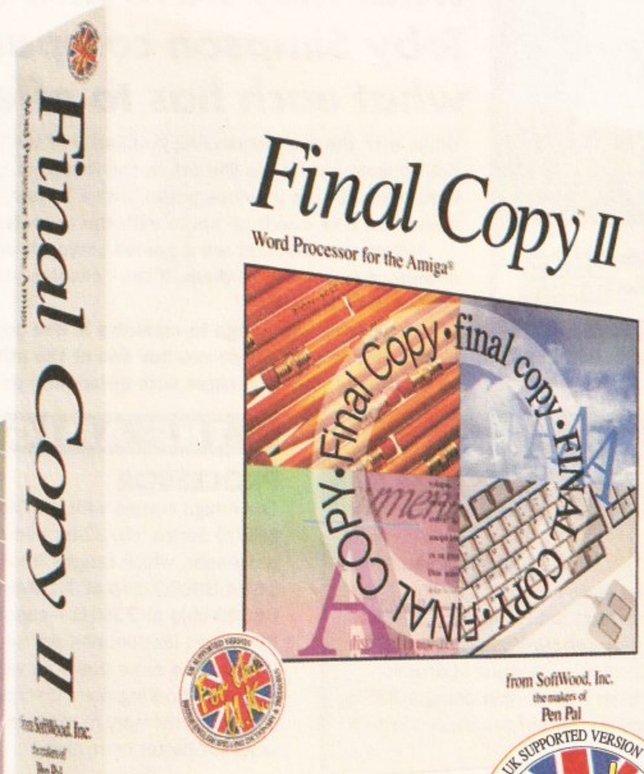
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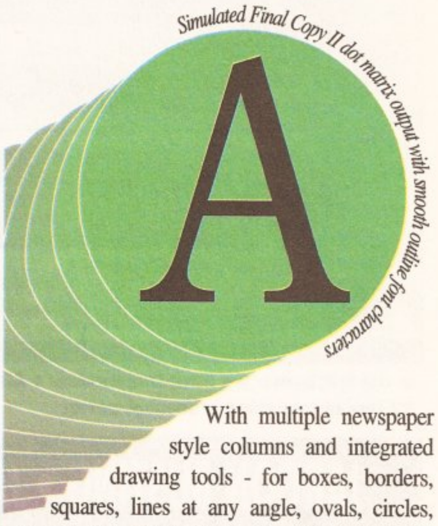
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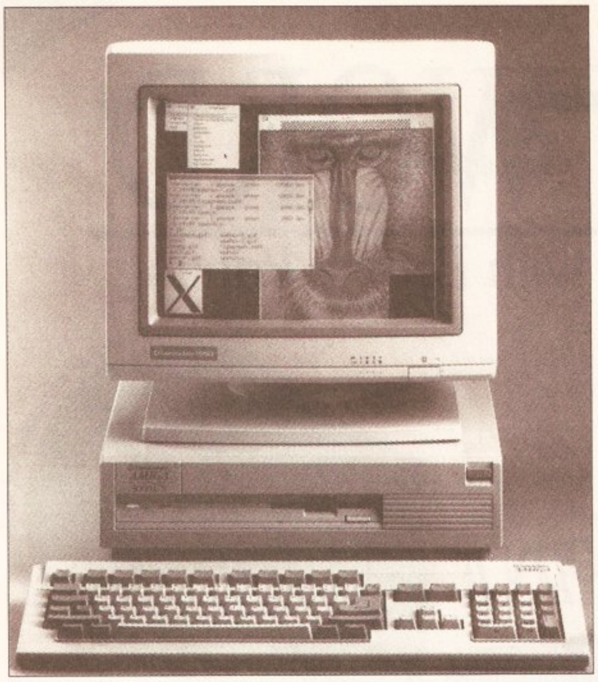
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AMS

THE AMIGA VERSUS CONSOLES

Battle of the

With the onslaught of computer games consoles, perhaps you are wondering what they have that the Amiga does not? Toby Simpson compares the two and sees what each has to offer



In the left corner we have Commodore's A3000, with a full 32 bits of punishing processor power

What with the ever-increasing popularity of the PC on one side, and the phenomenal growth of the console market on the other, the Amiga is becoming sandwiched between a rock and a hard place. In the previous pages we've looked at how the Amiga can beat the PC at its own game, but how can it compete with the consoles?

Whether or not you are a games player, it can't be denied that the Amiga owes its enormous popularity to them. If the consoles steal the Amiga's game market, its position begins to look shaky.

Comparing the Amiga to consoles is like comparing a Porsche Carerra to a BMW 7 series. Depending on your needs you buy one or the other. Consoles are designed with video trickery as a prime requisite, Amigas with computing power in mind. Let's see how they weigh up...

JARGON BUSTING • JARGON BUSTING

MIPS – Millions of Instructions Per Second. This is a rating of how fast a processor is capable of executing machine code instructions. This can be a very unreliable way of determining how fast a CPU is. RISC chips have fewer, simpler instructions so that they can run faster. The 68000 series chips found in the Amiga are CISC chips – Complex Instruction Set. A CISC chip doing 10MIPS is faster than a RISC chip doing 10MIPS, as the RISC chip will require more instructions to perform each complex operation.

DMA – Direct Memory Access. This allows computer hardware to insert data directly into a computer's memory without having to go through the microprocessor. In the case of Audio DMA, for example, the Audio hardware is able to fetch the next byte to send out to the speakers by itself, without having to interrupt the processor, and thus not slowing your computer down. In the case of the Amiga, many parts of the machine all require DMA abilities, and in some cases it is possible to slow your computer down because there is simply not enough time for everything to get what it wants.

DSP – Digital Signal Processor. This is a very fast processor designed especially for the rapid processing of digital information. With analogue to digital and digital to analogue converters they can be used to process better than CD quality sound. DSPs are found in modern keyboards and other sound studio wizardry. They are used in computers primarily for sound and graphics – although most DSPs will turn into FAX machines, modems and answering machines simply by changing their software.

ROM – Read Only Memory. This is memory inside your computer that you cannot write to. The Kickstart inside the Amiga is ROM. ROM is non-volatile, this means that when the power is switched off, it retains its contents. Conventional RAM (Random Access Memory) loses its contents when power is lost, and is therefore not suitable to store games in for video console cartridges. You can make RAM do the job of ROM by adding very expensive battery back-up systems.

Cartridge – A small plastic case usually containing just a ROM chip with information stored on it. More advanced cartridges can have some RAM, and batteries to enable information to be saved to them (such as saving games on consoles). It is becoming common now for games publishers to try and pack other electronic wizardry on to cartridges in order to make their games better than their competitors.

THE AMIGA

PROCESSOR

The Amiga comes with the Motorola 68000 series 16/32-bit microprocessor, which ranges from the 16-bit 68000 chip at 7.14MHz to the 68040 chip at 33MHz – capable of 29 million instructions per second (MIPS). The more powerful versions ship with floating point co-processor chips and memory management units for better operation.

VIDEO DISPLAY

This ranges from 320x200 to 1280x512. Modes which are 320 pixels wide are able to use up to 64 colours from a palette of 4096, or using a special graphics mode called HAM, can display up to 4096 colours.

Video display hardware is advanced and has a graphics co-processor called the copper, which can execute three simple instructions allowing some stunning video trickery, including mirroring effects and placing more colours on the screen than you thought possible! Other graphics modes include productivity mode, 640x900 and VGA 4 colour. Dual playfields enable two independent screens to be overlaid with colour 0 on the front one being transparent. This effect is used frequently and almost entirely in games.

SPRITE HARDWARE

Eight sprites, 16 pixels wide with no height limitations. Sprites are composed of up to three colours. By merging two sprites together, however, it is possible to make them 16 colours. Sprites can be scrolled in hardware.

AUDIO HARDWARE

This is composed of four channels, two on the left channel and two on the right channel. Each channel supports 8-bit sample outputs using DMA. Channels can produce some clever effects by modulating one channel with another. Volume is controllable on 64 levels.

OPERATING SYSTEM

The Amiga features complex pre-emptive multi-tasking with an advanced graphics user interface.

GAMES SOFTWARE

A wide range of titles is available for the Amiga. Prices vary from as little as £1.99 for cheap budget titles to as much as £39.99 for some of the more advanced gaming software. The type of software varies considerably from simulation software to state-of-the-art platform games.

APPLICATIONS SOFTWARE

An extensive choice exists in this area. Although not as comprehensive as the IBM PC, the Amiga sports impressive business applications.

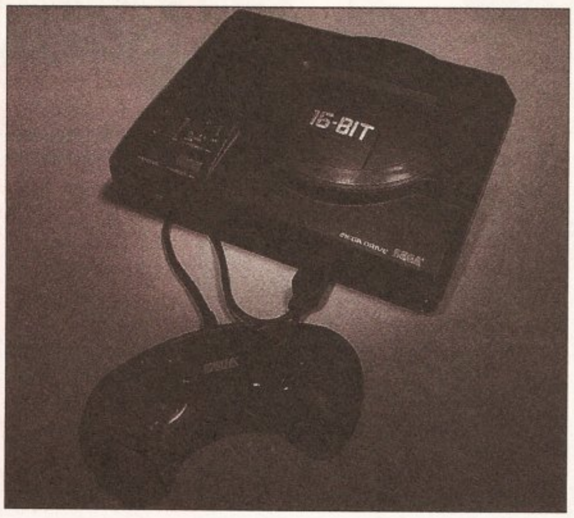
EXPANSION

The Amiga can be expanded in a variety of ways. Its speed, memory and facilities can be expanded greatly. You can add industry standard modems, printers and networking.

FUTURE

The future is bright. Commodore will want to keep future Amigas as compatible with existing models as possible. Commodore has said that we can expect it to continue enhancing the Amiga range.

GIANTS



In the right corner we have Sega's Megadrive. It's lean and mean, but lacking a keyboard

THE CONSOLE

PROCESSOR

This varies. Older 8-bit consoles tended to have Z80-based chips inside them. The Sega Megadrive has the 68000 chip, as does the Amiga. Super Nintendos have an advanced version of the 6502 chip that was found in the Commodore 64 and BBC Micro. Consoles are not designed to do raw processing work, and rely on advanced custom video hardware to perform their work, so processor speed and power is not as important. The amount of colours varies; from 512 to 32768. (The latter refers to the Super Nintendo.)

VIDEO DISPLAY

Resolutions are limited usually to choices such as 320x200, or 256x200. Higher resolutions are not usually needed for games. Consoles more than make up for this with playfield hardware far superior to the Amiga.

One console can have up to four independently scrolling screens overlaid to produce some stunning paralaxing effects. Most modern console hardware can automatically character map on to 8x8, 16x16 or 32x32 blocks on the screen making games which make displays that are built from blocks very easy to write indeed. Some even have hardware based graphic enlargement, rotation and reduction hardware built-in.

SPRITE HARDWARE

This area is particularly advanced. Sprites consist of multiple multicoloured independent sprites of varying sizes which are typically up to 128 sprites of 64x64 pixels. All of these could behave as like the Amiga sprites but are simply more powerful.

AUDIO HARDWARE

This varies. Because of the shortage of ROM space on cartridges, modern console audio hardware tends to be advanced synthesis hardware rather than a sample playback machine. Samples use a lot of memory. A typical sound-tracker style tune on the Amiga may use up to 250K.

Cartridges are expensive to produce, and the more ROM space you require on them, the more expensive they become. Some consoles now have DSPs (Digital Signal Processors) inside them to increase their ability in this field. Some DSPs can handle compressed data, making them ideal for console based applications.

OPERATING SYSTEM

This is basic, if indeed there is one – very few consoles have any operating system whatsoever, and those that do have a very simple selection of functions available.

Programmers for consoles are expected to be programming the video hardware directly, and there are no uses for an operating system as it would be the first thing that a programmer would disable when writing a game anyway!

GAMES SOFTWARE

There's certainly no shortage on this score. And it's very good as well. Games software is what these machines are designed to use, and this they do very well. Some of the modern games consoles, such as the Super Nintendo and Sega Megadrive, have the kind of smooth scrolling effects which would blow your socks off. The range of software is good, but not nearly as good as on the Amiga. The cartridges are expensive, usually upwards of £25.

APPLICATION SOFTWARE

There is none to speak of. Occasionally a software house will release a cartridge that is supposedly an application rather than a game. Most are junior paint packages.

EXPANSION

Expansion possibilities are bleak. Although there is a good selection of joysticks, guns, and other games-playing goodies, if you tried to attach a printer, you'd have problems.

FUTURE

The games console is around to stay, but don't expect individual consoles which are here today to be supported in the future. As console companies enhance their hardware, newer models will inevitably be incompatible with previous ones. This will mean that users have to buy a new machine *and* new software.

CONSOLING THOUGHTS

If you want a machine purely for games, and for nothing else whatsoever, and you are prepared to pay the huge prices for cartridges, then a console is the machine for you. But don't expect to be still using it in a couple of years time – unless you're lucky. The console market is moving much faster than the home computer market, and future models are unlikely to be compatible. Whereas you can enhance your Amiga by adding a faster processor, you simply cannot do this sort of thing with a console, which limits them considerably. When Sega brings out its next block-busting Sega Super-Mega-Hyper drive, it is likely to have specifications which will amaze and astonish you. If you want one though, it'll be a case of selling the old... and buying the new...

Consoles are packed with advanced custom video hardware. They are extremely good at what they do. If you need to have this illustrated to you, just pop down to your local dealer and ask to see a game such as *Sonic the Hedgehog* on the Sega Megadrive. That sort of smooth rapid scrolling and sprite handling is far beyond the Amiga's capabilities. The people at Nintendo and Sega are experts at what they do. Sega, for example, produces some of the most stunning arcade machines you have ever seen. The games consoles you buy are simply cheaper sub-sets of those arcade machines, and this is reflected in the quality of the software.

If you are expecting to word process, save data, use a modem, play around with programming – or in fact anything at all that is not related to games – you ought to be seriously considering enhancing your Amiga instead.

The problem with consoles, as far as Amiga owners are concerned, lies squarely with the sheer volume of units that companies such as Sega and Nintendo are selling: both of them expect to sell well over half a million units this year. So what? Games have traditionally sold the A500, and games are what are primarily selling the A600 now. Should buyers decide to buy the consoles instead of the Amiga machines then Commodore loses unit sales. There's another catch... software houses.

It's simply a matter of economics. If you can develop a game for a console and sell 200,000 units, while the Amiga version might only achieve 30,000, which are you going to do? Unfortunately for the Amiga, more and more software houses are making the decision to slow down, if not discontinue Amiga games development. It's just not bringing in the money any longer. Consoles make better economical sense. You can develop a game on the Sega much more easily than on the Amiga: there's no operating system to worry about, no extensive programming rules. You don't have to worry that the user of a Sega Megadrive might have a 68030 chip and a hard disk attached. This, with the severe lack of piracy on the consoles, and the copies you can sell are attractive with a capital A.

What can we do? Very little. If every Amiga owner who had pirated software went out and bought the originals, the result could be stunning. Software piracy is illegal and immoral. As long as it continues in such quantity, you'll gradually see less and less of the state-of-the-art games coming on to the Amiga. Unless Commodore can penetrate the corporate computer market sooner rather than later, it too is going to suffer.

Let's hope it's a good Christmas for Commodore and software houses worldwide.

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CONTENTS AT-A-GLANCE

OUR EXPERTS TACKLE YOUR REAL-LIFE PROBLEMS

AMIGA ANSWERS

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- All your Chip RAM hassles sorted
- Modem magic for beginners
- What's best for video – Amiga or PC?
- Hooking up to MIDI
- The truth about CD-ROM

ALL OF YOUR AMIGA PROBLEMS SOLVED

SO WHAT DO ALL THOSE ICONS MEAN?


Beginners: this icon will appear next to any questions which are 'basic' in content.


General: this icon is used for any general Amiga-related queries.


Caution: be sure that you fully understand the answer before trying it out.


Danger: the answer to this question could well invalidate your warranty – or you!


Hardware: this icon is used to denote questions relating to general hardware.


Buying advice: we use this icon if the question asks us for buying advice.


Printers: this icon denotes a query about printers, printer drivers and so on.


Technical: any queries about programming will have this icon next to them.


Video: this icon relates to any query about using your Amiga with video hardware.


Music: this icon is for questions about MIDI, sampling, synthesizers and so on.


Programs: any program-specific queries have this icon next to them.


Comms: if your question relates to comms, this is the icon that we'll use.

WHATEVER YOUR PROBLEM WITH THE AMIGA, WE ARE HERE TO SOLVE IT

That's the task we have set ourselves in giving you the best possible support for your Amiga. We are confident that our experts can cope with any technical questions you can throw at them. If they don't already know the answer to your problem, they will find it out for you.

We are prepared to deal with any problem you have with the Amiga, from general enquiries about AmigaDOS or Workbench, through questions about specific pieces of software and hardware, to advice on what you need to buy to do a particular task. If it's to do with the Amiga, we will help out. What we cannot do is offer this service over the telephone – do not phone us with your enquiries, but write to us at the address below.

We also cannot enter into personal correspondence – all enquiries will be dealt with in the pages of the magazine. This does mean a bit of a delay in solving your problem, but you'll just have to be a little patient and wait for it to appear in print. You won't get a personal reply even if you enclose an SAE with your letter, so please don't bother.

Send your question on the form below to: Amiga Answers, *Amiga Shopper*, Beauford Court, 30 Monmouth Street, Bath BA1 2BW.

The Amiga Answers panel consists of our consultant editors Mark Smiddy and Jeff Walker – and, of course, our resident deputy editor Cliff Ramshaw. We will also be calling on the services of all our other contributors, so you won't be able to catch us napping whatever the subject of your query.

Each panelist will be dealing with queries in their own specialist area(s) so it would help us greatly if, when writing, you label your query envelope with the name of the expert who can solve your particular problem.

Below is a list of areas of expertise. It's a list that we will add to and update every month, so you will know who to write to about any subjects not mentioned here.

Gary Whiteley –	Video
Paul Overaa –	Programming, music
Mick Draycott –	Hardware, programming, MIDI
Jeff Walker –	Desktop publishing, programming
Mark Smiddy –	AmigaDOS, business, CDTV, hardware projects, hard and floppy disk drives
Jason Holborn –	Public Domain, AMOS
Jolyon Ralph –	Programming, hardware, CDTV
Cliff Ramshaw –	All the other bits and pieces

If you send in a question for the Amiga Answers experts, please fill in and include the form below (or a photocopy if you don't want to cut up your magazine). And please also make sure that you include all the relevant details – version numbers of software and so on – so that we have the best chance of helping you. Send your form and question to: Amiga Answers, *Amiga Shopper*, 30 Monmouth Street, Bath BA1 2BW. Sorry, but we cannot personally reply to any questions – even if you include an SAE.

Name: ____________________

Address: ____________________

____

____

Your machine:

A500 ❑ **A1000** ❑ **A1500** ❑

A2000 ❑ **A3000** ❑

Approximate age of machine: ________

Kickstart version (displayed at the 'insert Workbench' prompt)

1.2 ❑ **1.3** ❑ **2.x** ❑

Workbench revision (written on the Workbench disk)

1.2 ❑ **1.3** ❑ **1.3.2** ❑ **2.x** ❑

PCB revision (if known). Do not take you machine apart just to look for this! ________

Total memory fitted (see AVAIL in Shell for 1.3 Workbench) ________

Chip memory available (see AVAIL in Shell) ________

Agnus chip (if known) ________

Extra drive #1 (3.5"/5.25") as DF__: Manufacturer ________

Extra drive #2 (3.5"/5.25") as DF__: Manufacturer ________

Hard disk: ____Mb as DH__: Manufacturer ________

Extra RAM fitted – type, size in Mb and manufacturer ________

Details of any other hardware which could help us to answer your question:

____

____

____

Now, use this space to describe your problem, including as much relevant information as possible. Please continue on a separate sheet if necessary.

____

AS 19

NO PROBLEM!

Welcome once more to *Amiga Answers*, the section of the magazine where we endeavour to straighten out your hassles with that wonderful but occasionally stubborn machine, the Amiga. Every month we devote more space and apply more resources than any other Amiga magazine to solving your problems. We receive something like 100 queries a week, so the service is obviously appreciated.

It's my job to co-ordinate the whole thing: sorting through the questions and sending them off to the relevant chappies for the kind of in-depth answers you've come to expect; and compiling them into the lovingly crafted pages which you see before you.

I call on a variety of expertise to make sure you get the answers you need, which is why *Amiga Answers* is so successful. There's Mark Smiddy, industry guru, AmigaDOS-tamer and business applications wizard; Jeff Walker, probably the most knowledgeable Amiga desktop publisher there is; and Jason Holborn, long-time AMOS explorer and PD sampler, as well as good all-rounder (or should that be all round good guy?); and Toby Simpson, lead programmer for Millennium and accelerator expert.

If it's a question about video, I'll pass it on to Gary Whiteley, our professional videographer for whom the word 'genlock' means 'mixing Amiga graphics with video for magical results' and for whom the word 'snipwirral' means nothing.

Programming queries are dealt with by Paul Overaa, who's not afraid to code in any language, and who doubles as a MIDI maestro to solve your sequencing slip-ups.

Our hardware guru is Jolyon Ralph. This man knows just about everything about disks, both hard and floppy, and what he doesn't know about memory he's probably forgotten. Communication breakdowns are fixed-up by Phil Harris.

All in all, a formidable team, supplemented by my own not inconsiderable Amiga suss. Let's face it, if we can't answer your question, it's probably one of the Mysteries of the Universe.

This month we answer the enormous number of queries we've had regarding cheap accelerator options, give the low-down on Amiga communications for beginners, and dispel a few myths about CD-ROM. We also give directions on setting up a multimedia system, analyse the problems facing buyers of second-hand monitors, and much more.

Don't forget to keep sending us those problems – we love them!

Cheers,

WHAT HAVE I GOT?

Is the drive inside my A590 a SCSI/XT/IDE/ Godknows what? My drive connects on to the XT connector. Is this the same as IDE?

The startup wait gets on my nerves. Is there any way to reduce it? My dip switches are set correctly for fast boot. The standard drive doesn't need the delay at all, so why is it there normally? I understand for externals, but why not just select delay on or off?

Is it possible to put the drive aside, ie elsewhere instead of hanging on the left? I want to extend the cable etc and I have the bits available so there's no problem there. But I wonder how far the signals will go before data losses. Any idea?

I wish to make the A500 Plus into a two box system, totally invalidating the guarantee, I know, but I hope to do this. Can I put a CDTV keyboard on to my motherboard (obviously changing the connectors). If I guess correctly, the data format should be the same and this *will* be possible. Optionally I would prefer an A1500 type keyboard (nicer!), so can they be bought separately?

Is it also possible to extend the internal disk drive cable?

I am planning to buy a monitor. I have my mind set on a multisync for future upgrade. I see you are now suggesting buying a multisync in the magazines and am wondering if you have tried the Acorn one? I have been quoted a price of £222. I tried it against the 8833Mk2 from Philips, and it is far better in my opinion.

Which Basic-type languages can access the RS232 port? I want to use it at at least 4800 baud for a comms program. Which languages should I stay clear of?

Robert Veal
East Lothian
Scotland

The drive in your A590 is an XT-IDE drive. You will want to upgrade that to a SCSI drive as soon as you can, as XT-IDE is really nasty and slow. You can replace the XT drive with a SCSI drive very simply.

The startup delay is due to the A590 first checking for any SCSI drives attached. When it finds no SCSI drives, it then checks for XT IDE. If you replace the IDE with a SCSI drive it will boot up faster.

You can extend the actual hard drive by a foot or so, but you can't extend the A590 itself, that must be directly connected to the side of the A500.

It's possible to rewire a CDTV (or 2000/3000) keyboard to work on an A500, but rememeber that both the power and drive lights are connected to the A500 keyboard, so you'll have to wire up something to replace these. Also the CTRL-AMIGA-AMIGA reset won't work, so you'll need to wire up a reset switch to the RESET line on the 68000 chip. Unless you *really* hate the A500 keyboard I'd say don't bother.

You can extend the internal disk drive cable – again, probably no more than a foot or so to be safe.

Any multisync that can handle 15.75Khz horizontal sync and 50Hz vertical sync will work with the Amiga. Beware: a lot of new multisyncs only handle horizontal syncs of 30Khz and higher. ***JR***

NOT GOOD ENOUGH

I have an Amiga 500 Plus and a Citizen 120D Plus, which I use to print out listings, letters and the occasional university report. To try the combination out I bought an issue of your sister magazine, *Amiga Format*, which featured a *PageSetter 1.2* cover disk.

Using the fonts and preferences options upon loading the DTP software and printing various letters, there appears to be no difference between draft and NLQ print, no matter what font or style I use. On the other hand, if I use the Workbench 2.04 Shell and send control characters and text to the printer (using the printer's internal fonts, I think) then the NLQ print is excellent.

I obtained Citizen *Print Manager*, but this gave the same results, albeit much quicker. I've also tried setting the printer to NLQ with control characters and then using the DTP software, with no success.

Is this a limitation of *PageSetter 1.2*, or am I missing something obvious?

Neil Hughes
Brookvale
Hants

Well, yes, you are missing something simple, although it's not all that obvious. You almost sussed it out yourself when you realised that printing from the Shell used the printer's internal fonts.

continued on page 43

JARGON BUSTING • JARGON BUSTING

Dip switch – A method employed by several devices, including hard drives and printers, to enable the user to make manual adjustments to the way the device behaves.

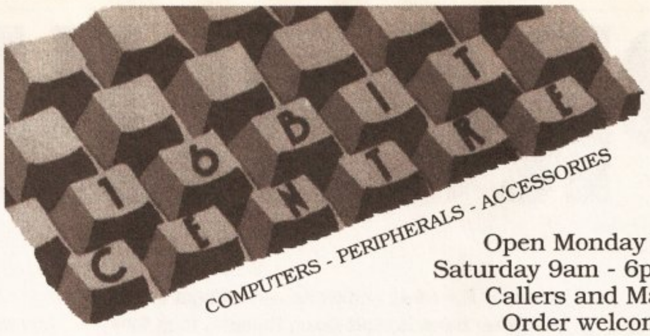
Multisync monitor – A monitor which can accept its signal at a variety of frequencies, usually ranging from 15 to 32KHz. A multisync is useful for displaying signal produced by a flicker fixer or from an IBM PC VGA card.

SCSI – Small Computer Systems Interface is the standard used for connecting hard drives, CD-ROM drives and tape back-up units to computers.

Shell – A method of communicating with the Amiga's operating system via the keyboard rather than the more usual mouse and windows method of Workbench. The Shell is the interface which 'surrounds' the Kernel, the central part of the operating system.

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VISA

Access

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PageSetter 1.2 does not use the printer's internal fonts. Its print-outs are basically 'screen dumps' – graphics print-outs in other words, copying the pixels from the screen and printing them at the screen's resolution, which is about 65-75 dots per inch depending on what monitor you are using. This system means that you can use many more fonts than are available inside the printer, and also that you can print pictures of course.

The type of fonts *PageSetter 1.2* uses, Amiga screen or 'bitmapped' fonts, are displayed at screen resolution, so the printed output is low resolution.

To get higher quality results you need to use a word processor or desktop publishing program that supports 'scalable' or 'outline' typefaces like Compugraphic or Adobe Type 1. These will be displayed at screen resolution, but printed at the highest resolution the printer is capable of. The down side of scalable typefaces is that they can eat up memory very quickly, and they can take a long time to print.

PageSetter 1.2 is an old and really quite poor DTP program; even with a laser printer attached it would be impossible to get high quality results from it. I think you'll be better off with a word processor like *ProWrite* or *Wordworth*. ***JW***

MAC DRIVE

I have an Amiga 500 computer (Kickstart 1.3). I have the opportunity to purchase an internal 40Mb SCSI hard drive from an Apple Macintosh computer. Would it be possible to connect this drive to my Amiga externally? Presumably I would need some kind of box, a SCSI interface and a power supply.

Mark Adams
Great Dunmow
Essex

A standard Macintosh SCSI drive should work fine on the Amiga with a SCSI interface. Supra and Dataflyer produce hard drive interfaces which can use such drives on the Amiga 500. Your best bet would be to get a second-hand Commodore A590, and replace the 20Mb drive in this with the 40Mb, as the A590 controller is probably the best currently available for the Amiga 500. ***JR***

HOLA!

I have a RocGen Plus genlock and it doesn't work with my WB1.2 Amiga 500. The drives lock when the genlock is connected to the RGB port and I get no picture from the genlock's SCART output to the Amiga monitor. If I connect the Amiga's mono output to the monitor I still get… nothing. When I connect the genlock it seems normal and the power LED goes on, but the Amiga doesn't work at all.

I saw the genlock working fine on the A600 in the computer shop, so what do you think the problem is? Should I change the 1.2 ROM in my Amiga?

José das Neves Filipe
Alpiarà
Portugal

This sounds as if the genlock and Amiga are together overloading the Amiga's power supply, (which is possible with some older units) with the result that the Amiga doesn't get any current, and so can't run. If your Amiga works OK without the RocGen connected then this is almost certainly the problem.

The solution is to obtain an external power supply for the RocGen Plus – an option which is recommended in the RocGen manual. You may be able to get one from your dealer, or it might be possible to find a substitute which will do the job, though I wouldn't recommend this unless you are certain it will have the correct voltage and current, as well as connector.

If you want to make sure, find a dealer who will let you test your Amiga and genlock with an external power supply – then you can be certain that it is a power supply problem before you commit yourself. ***GW***

ACCELERATION ON THE CHEAP

I would like to buy a 16MHz 68000 or 68010 and replace my existing 68000 chip at 7.14MHz with it. Would this work?

Lots of people

No. It won't. Your Amiga is clocked at 7.14Mhz for a very good reason. 7.14, when multiplied by 4 is 28MHz, which is the PAL display clock frequency. The reason your Amiga is so suited to video applications such as genlocking is because the entire system clocks on multiples of 7.14MHz. If you replace your 7.14MHz 68000 chip (which is in fact an 8Mhz 68000 chip, running at 7.14MHz) with a 10Mhz, 12 or even 16MHz 68000 you will notice *no difference whatsoever* as the chip will still be clocked at 7.14MHz. The 68010 chip at 7.14MHz is slightly faster than the 68000 chip at 7.14MHz, which is why it is a cheap option for expansion. ***TS***

DRIVERS ARE A BIND

I recently bought a GVP Impact Series II hard disk drive for my A500 Plus and while I am very pleased with the speed programs load, I am disappointed with the documentation supplied. I attempted to carry out the automatic installation procedure, but encountered the message "Can't find gvpscsistrl.device". Some blind fiddling with the Binddriver menu selection got me to the stage of asking whether or not to copy some files on to the drive. After copying the Workbench, I left the program. I would be grateful if you can give me some further advice in the following areas:
a) How to partition the drive.
b) How to install a virus killer to check the drive during boot up.
c) Explain what Binddriver is.
d) How to back up the drive.
e) How to install programs to the hard drive.
f) How to install Workbench.

K Donnely
Kilburn
London

Let me say first off that I have not personally installed a GVP drive on an A500 Plus – but I have heard of these problems. They were caused when Commodore released the A500 Plus and caught us all with our metaphorical trousers down.

a) The best place to get technical support, and someone with whom to go through this procedure, is from Silica Distribution on 081 309 1111. It probably supplied the drive in the first place and should be able to offer full technical support.

b) Installing a suitable virus killer is a two stage process. First you have to copy it on to the hard drive, and second you have to activate it in the startup-sequence. The simplest (if not the neatest method) is to copy it into the special WBStartup drawer. For a better method consult the AmigaDOS column in *Amiga Shopper* 11. This contains a detailed discussion on the methods of automatically starting programs from a boot sequence. A good background virus killer is *VirusX*, but there are plenty to choose from – consult your local PD library for the latest.

c) *BindDrivers* (I assume that's what GVP is referring to) is a special program which mounts certain types of hard disks and older RAM expansions. If you need *BindDrivers*, there will be a drawer on the Workbench called "Expansion". If this drawer is missing or empty (no icons) then *BindDrivers* is not used.

d) You can back up your hard drive in a number of different ways – but by far the simplest method is to use a good commercial back-up utility such as *Quarterback*. However, a perfectly good back-up utility is supplied with Workbench 2 anyway. *HDBackup* may not be as friendly as *Quarterback*, but at least it's free – you'll find it in the Tools drawer on the Extras2. disk.

e) This is a difficult question to answer because different programs have different requirements. Generally speaking, most commercial programs are supplied with installation utilities or can be dragged into a new drawer from the Workbench. It is possible to construct a semi-automatic install routine from AmigaDOS and if a couple of readers write in, I will include it in a future issue.

f) Workbench 2.04 is supplied on three disks. The main disk contains all you need to start the machine, the Extras disk has lots of little goodies, and the fonts disk should be obvious. When you installed your hard drive you only copied a minimal Workbench set-up and you will have missed a lot of the better stuff. I find

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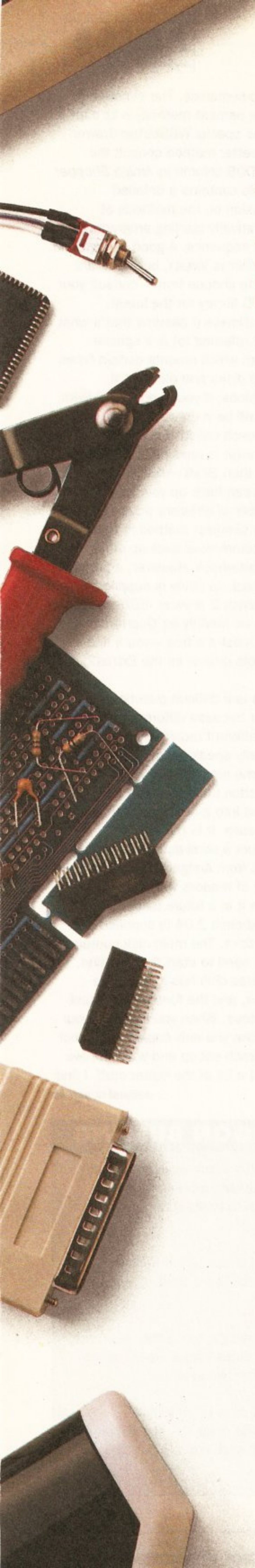
JARGON BUSTING • JARGON BUSTING

Bitplane/bitmap – A bitplane is an area of memory where every binary bit corresponds to a pixel on the screen. One bitplane represents a monochrome image, several can be overlayed (a bitmap) to represent a colour image.

Font – The group of letters, numbers and special characters that comprise one variation of typeface, eg: 12pt Times, 12pt Times Bold, 12pt Times Italic.

Genlock – A way of slaving one video source (eg Amiga) to another (eg video tape) in order to synchronise their signals to allow stable wipes, mixes and other effects including overlay between the two sources.

Virus – A small program that can lie hidden in memory or on a disk, duplicating itself on to any disks inserted in the machine, and generally causing havoc. There are many virus killers available in the public domain designed to deal with this menace.



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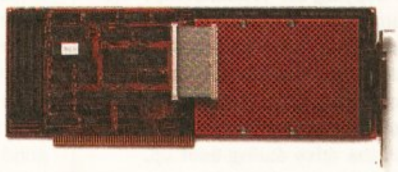
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JARGON BUSTING • JARGON BUSTING

Accelerator board – A device which either includes a central processor like the Amiga's, or a more advanced one in the same range, but operating at a higher speed. An accelerator is useful for calculation-intensive applications, such as 3D rendering.

Chip RAM – The area of the Amiga's memory directly accessible by the custom graphics and sound chips. Originally a maximum of 512K, newer machines fitted with the fatter Agnus graphics chip can access 1Mb, enabling smoother animations and more screens to be displayed at once. The new A600 comes with an Agnus chip capable of addressing 2Mb of Chip RAM.

Modem – A device which converts computer signals into a format suitable for transmission along a phone line. Likewise, it will convert incoming signals into a form the computer can recognise. External modems will work with any computer, although it is possible to buy Amiga-specific cards to plug into the A1500 and A2000, keeping the serial port free.

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the simplest solution is as follows:

Boot your machine from hard disk. Double click on the Shell icon. Insert the Workbench disk in the internal drive. Enter the following at the prompt (1.SYS>):

```
COPY DF0:#? TO SYS: ALL
```

Press [Return] or [Enter] when you finish typing. (Don't worry if you make a mistake. It's almost impossible to get this command to overwrite something it shouldn't). When the operation completes – you'll see a lot of information scroll up the window – insert the Extras disk and enter the command detailed above again.

Finally, repeat the last step for the Fonts disk.

You can, of course, perform that entire operation from the Workbench – but in practice, AmigaDOS is faster and keeps you more informed. *Do not* under any circumstances use this technique with any disks other than those supplied by Commodore. ***MS***

CHIP RAM HASSLE

I recently carried out the modifications on my Amiga to allow the 0.5Mb in the trapdoor to be configured as Chip RAM. All was well until I inserted the hard drive. When booting, the process stops and displays the default Workbench screen with no icons and a requester with the writing not visible (ie white). It would seem the hard drive needs Fast mem, but it has its own located at $200000 to $600000. I know the trap door expansion is located from $c00000 to $c80000. I want 1Mb Chip RAM.

A Fung
Wigan
Greater Manchester

I'm suprised that your Protar hard drive doesn't seem to like 1Mb of Chip RAM. This is either a very serious design fault in the drive, or a problem caused by the following...

When you partition your hard drive you can tell the drive what type of memory to use for the drive buffers. Usually it is set so that any type of memory will do, but if your drive is set up so it requires Fast RAM, then your hard drive may fail if you only have 1Mb of Chip RAM. (The RAM on the hard drive card is not available to the system until after the hard disk is initialised, so that can't be used). If you can, revert to 0.5Mb Chip/0.5Mb Fast and try repartitioning the drive, check to make sure the buffer RAM is set to Chip or Any (rather than Fast). Then try the conversion again. Other than that complain again to Protar. ***JR***

WHICH ACCELERATOR

Please could you help me with some information as regards which accelerator would be best and most compatible with my system?

I am not really satisfied with the standard 7.14MHz CPU, and would like an accelerator which would speed up every aspect of the Amiga. This includes *Vista, DPaint IV, Wordworth,* and some games that I have which are designed to take account of a quicker CPU.

I am confused by the vast range. A 14MHz accelerator does not seem very attractive at all. What I really want is the best all round reliable accelerator, say 28MHz or faster, that is easy to fit and set up. I would also like to be able to switch back to 68000 mode.

I read somewhere that in order for an accelerator to work, there must be a super fast hard drive controller fitted. Will I have a problem with this?

I have also read that accelerators require 32-bit RAM and maths co-processors. Is this correct for the uses I have in mind and a few I haven't got round to yet?

Philip Ebbans
Walsall
W Midlands

I would suggest a 68030 based accelerator card, such as the wide range of GVP expansions. These are easy to fit and install, and provide you with a 68000 fall back mode for compatibility with badly written software.

In answer to your other questions, you do not need to get a super fast hard disk controller, but you will not notice much of a speed increase in hard disk operations with your new accelerator installed. If you are in doubt, check with the hard disk manufacturer.

Although you do not specifically need 32-bit RAM, it certainly makes a difference with a 32-bit chip such as the 68030. Without it, the 68030 chip has to access your current RAM, which is 16-bit. To read a 32-bit chunk of memory, it would have to read it in two halves – thus effectively doing twice the work. This is not to say that you will not notice a considerable increase in speed – you will. Most 68030 cards available these days either come with some 32-bit RAM, or sockets so that you can fit some yourself (or, preferably, your dealer can). 32-bit RAM will help you to make the most of the 68030's available power.

As far as the floating point co-processor (FPU) goes, this is very application specific. You mention *Vista*: if you are likely to perform considerable amounts of *Vista* work, then it's something you ought to seriously consider. The FPU performs the most common floating point operations in hardware, and is a lot quicker at doing them than the 680x0 chip. There are two FPUs available for the 68000 series of chips, the 68881 and the 68882. Usually, with 68030 boards, they have 68882 chips – as these are faster and more powerful than their predecessors. ***TS***

VANISHING CLOCK

When I fitted the super card Ami II, I had to connect two wires to the 40-pin 8520 CIA chip (U301). After carefully reassembling the B2000 on start up, no matter what software I use it states "unable to find battery backed-up clock". I have disconnected the super card with only the same result. Other than the clock, all software loads as before. Please help as it is very annoying having to reset the clock each time I load software.

NJ Devereaux
Neasdon

It is possible that the clock on your motherboard has failed, but it is more likely that it is 'confused'. Try the command SETCLOCK RESET from the CLI before trying to set the time. Failing that, the public domain program *ClockDoctor* should sort you out. ***JR***

LOVER'S TIFF

At our school we have a scanner and several RM Nimbus computers which we use to scan images in up to 256 colours. These are then saved in TIFF format. I would like to be able to transfer these images but I need a piece of software that will convert the TIFF images to standard IFF format. I have spoken to several PD libraries and have bought both *MessySID II* and *Graphic Interchange* as they advised. Fine, but the pictures won't load on *DPaint IV. Graphic Interchange* came with lots of utilities to convert images to and from GIF format, but there aren't any utilities on the disk which can handle TIFF format. Please help.

Wayne Bosworth
Rothwell
Northants

I'm afraid I'm the bearer of bad news, Wayne. GIF format is totally different to TIFF, so I'm afraid the disk that you bought isn't going to help you at all. What you need is a program written to specifically handle TIFF format images.

Unfortunately, as far as I'm aware there are no utilities of this type available through the PD libraries. As a result, the only way to achieve what you require is to either try and convert the TIFF format files to GIF format using a PC public domain conversion program (I'm quite sure there are a couple available) or dig deep into your pockets and splash out on a commercial image conversion utility such as ASDG's *Art Department Professional* or *RasterLink* from Active Circuits Inc.

Of the two products that I've mentioned, you're probably better off with *RasterLink*, simply because *ADPro* does not support TIFF as standard (you'll have to buy the TIFF loader separately).

RasterLink also handles Mac PICT format files, Targa, Sun Rasterfile, Sculpt Direct/RAW RGB and Turbo Silver format. Unfortunately, I'm not sure whether *RasterLink* is still available as a product in its own right now that the Amiga Centre Scotland has started to bundle it with its 24-bit Harlequin frame buffer board. It's always worth a try though – ACS can be contacted on 031 557 4242. ***JH***

TTL V RGB

I would like to connect my Amiga 500 Plus to the TTL RGB input of my Commodore 1081 monitor, but I'm unsure of some of the connections between the 23-pin RGB connector of the Amiga and the 8-pin DIN connector on the monitor. The TTL RGB, intensity and sync are obvious, but pin 1 of the DIN plug is shown as 'status' in the monitor handbook and I'm not sure where to connect this to.

The reason I wish to do this, by the way, is because I use the RGB input on the 1081 with a TV tuner.

John Ireland
Faversham
Kent

I'm sorry, John, but this seems like a very odd thing to do! Why not buy a SCART switcher to switch between your two SCART inputs and have the best of both worlds? Connecting your Amiga output to the TTL socket on the 1081 would mean you could only have 16 colours on screen, which would be a shame when you consider the Amiga's capabilities. A number of companies advertising in *Amiga Shopper* do these for around £20, not that much more than you'd pay for a made-up lead. ***GW***

BT DRIVES

After messing around with some of BT's surplus equipment in DT – a Torch 68000 hard disk – I pulled out a massive double height 5.25" hard disk. A-ha, that looks like an MFM edge connector on the back. I'll connect up the lead for the XT internal floppy. Now I'll power it up. Yep, the whole table starts to shake. The problem is, how do I use it, as my knowledge of MS-DOS is well limited? I have a dual-drive non-twisted cable but then it goes on about drive numbers. Help!

PS: the drive is made by Rodime Ltd. It's a series RD 200 and has one illegal address at 192 head 4. There's also a strange edge connector to the left of the MFM connector – it's 10 pins up – 10 pins down and like the MFM has a polarity slot two "pins" from the right. There is a terminating resistor pack behind the MFM connector. Will it work with Vortex's Golden Gate? One last point, on the PCB, there are only two 16-bit sockets with the four XT sockets. Is it possible to solder extra sockets into the PCB for the other two slots as there are holes and solder pads?

Guy C Sandford
Hastings
East Sussex

You have two major problems here. Firstly, the MFM hard drive you have needs to be connected to a hard disk controller, not to the floppy controller you have at the moment. With an Amiga 2000, a Commodore Bridgeboard and a standard XT MFM hard disk controller card will enable you to link this up; on an Amiga 500 Cumana does an interface that is suitable. To be totally honest though I'd suggest you get rid of the drive: MFM drives really are more trouble than they are worth, and I'd not recommend anyone try and use one unless they've got lots of patience. ***JR***

PIN MONEY

I am planning to buy a colour printer and would be most grateful if you could advise me whether to get a 9-pin or 24-pin, and also which make.

EM Butcher
Norwich

You wouldn't believe how often I am asked this question. The answer is simple: how much money do you want to spend?

If you can afford a 24-pin printer, then buy one, because the output will be of a higher quality than from a 9-pin printer, which is why they cost more. Unless, of course, you are not worried about quality, in which case go for a cheap 9-pin printer.

Which make? That's like asking which make of television should you buy. The idea is you have a darn good look around and buy the one you like the best within your budget. The two 24-pin models that appear to be battling it out for top spot at the moment are the Star LC24-200 and the Citizen Swift 24e. ***JW***

ANIMATION EXPANSION

I am a very keen beginner animator but I am finding that I run out of memory very quickly. I enquired about a 1.5Mb upgrade in a local computer shop and I was told that the motherboard has to be cut to fit it. Is this true, as I do not want to carry out any modifications myself and fitting costs would be astronomical? Also, could you tell me what new chips and alterations my computer would need to allow me to have 1Mb of Chip RAM.

Nigel Helliwell
Cullompton
Devon

The best way to upgrade the memory on your Amiga is first to convert to 1Mb of Chip RAM. This will require a new Agnus chip at around £50, plus around £25 for fitting. Once you have 1Mb of Chip RAM (which is far better for animation), you can add up to 8Mb of Fast RAM to the expansion port on the left side of your Amiga. Cortex does an excellent upgrade to take up to 8Mb of RAM, but the best value way to expand your memory is to buy a hard drive that takes expansion memory (such as the Commodore A590 or the GVP Series II). ***JR***

KINDA MS-DOS

If I save my *Kindwords* files as ASCII format on my AmigaDOS partition, is there any way I can get them into MS-DOS format and move them to the MS-DOS partition on my hard disk?

Patrick Skelton
York

This is actually very simple to do. All you need is a PC transfer program such as *CrossDOS*, *DOS-2-DOS* or my preferred weapon, *MessyDOS*. You'll be able to get hold of *MessyDOS* from any good PD library and once installed, moving a file is a simple as copying one. *MessyDOS* accesses PC disks in any floppy drive. In AmigaDOS an example could be:

```
COPY dh0:Filename to MSH:
```

where MSH: is the drive name of the *MessyDOS* device. Now drop into PC mode and call the file back from A: thus:

```
COPY A: C:
```

MS

MODEM COMPATIBILITY

I've been given a brand new "Stradcom" half card modem. Is there any way of getting it to run on my Amiga? I've got the phone line with the new style sockets and *NComm*. The modem unit has 1 edge connnector, 1 phone out and 2 phone in lines (one for Europe). The specs are: dialling capability – pulse and tone, modem data type – serial, binary, asynchronous 300BPS and 1200BPS. Protocols – CCITT V21 originate/answer 200BPS full duplex, CCITT V22 originate/answer 1200 BPS full duplex, CCITT V25 auto answering. Serial port data – serial, binary asynchronous, 7 or 8 data bits, 1 or 2 stop bits, odd, even or no parity. Port addresses and interrupts com1 – 3f8 3ffH IRQ4, com2 – 2f8 2ffH IRQ3, com3 – 3e8 3efH IRQ 4, com4 – 2e8 2efH IRQ3.

Steven Harrison
Winsford
Cheshire

First of all, let me thank you for all the detailed information. It makes this sort of problem much easier to solve. Unfortunately there is no way you will be able to run this modem on your Amiga, it's designed for a PC. It's a 'card' modem. PCs have 'slots' inside, the modem fits in one of these slots. The Amiga doesn't have any PC compatible slots so it won't work.

Your best bet is to try and sell it and buy an 'external' modem and a cable. The modem you have is pretty slow but you might be able to get £40-50 for it, if you're lucky. ***PH***

TOWER POWER

I intend to buy the Vortex Golden Gate 386SX PC/AT emulator which comes as standard with an AT IDE hard disk controller. I would therefore like to add an IDE hard disk to the system for the sole use of the PC emulator (it will operate a lot faster than my Seagate which is used by the Amiga side). The problem is, the three drive bays inside my A1500 are already used and therefore I have nowhere to mount the second hard drive. Do you know whether there is a conversion kit available similar to HiQ Ltd's HiQ Tower system for the A500 that will allow me to strip the A1500 out of its box and install it inside a Tower system casing.?

Tien That Ton
London

To be perfectly honest, there isn't a lot of call for such a conversion kit simply because the A1500 is already so expandable. You have however found one problem that many A1500 (and 2000) power users eventually stumble upon – the lack of drive bay space. I'm having exactly the same problem at the moment – I had hoped to install a tape streamer inside my B2000 but all the drive bays inside my machine are full too. All I can suggest is to try and source a casing for the drive and then have it connected to the Golden Gate via a

continued on page 50

PHOENIX

SALES 0532-311932

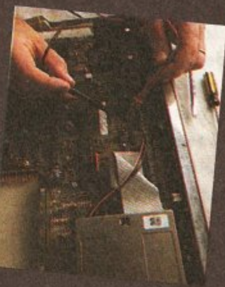
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Keyboard switchable!

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LC24-200 Mono £219.99
LC24-200 Colour.........................£268.99
XB24-200 Colour.........................£379.99
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These chips cover practically every popular memory expansion or Hard Drive system on the market for the Amiga ie. GVP, SUPRA, MICROBOTICS, COMMODORE

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PHOENIX will be at the Future Entertainment Show Nov 5-8th Earls Court. Be sure to come and see us there and take advantage of some incredible show bargains!

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Superb sound and excellent dynamics. These two-way stereo speakers are an Amiga standard- **Excellent companions on any gaming soiree!**

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"Thanks once again for your efficient service and patient advice."
S. Ward~ Norfolk

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- Cross Dos.................£22.99
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- Dos 2 Dos.................£29.99
- Opus Directory.................£29.99
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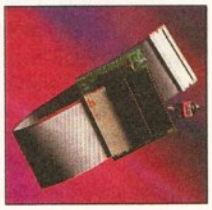
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Because some older games and business software will not run on the new Kickstart 2.04 ROM. PHOENIX have designed a sharer for both ROM chip sets. Switchable between 1.3 and 2.04 you can get all the benefits of the latest A500 Plus without the drawback of losing all your old software. Fits any Amiga 500/1500/2000.



- *Kickstart ROM Sharer.................£24.99
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- Kickstart 1.3 ROM.................£29.99
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*(ROM Chips not included)

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Now Only.. £79.99



The popular upgrade kit for 1.2 / 1.3 owners from Commodore is in stock and selling fast!

TRAIL BLAZERS-WHAT'S NEW IN OCTOBER 1992!

In this month's "TRAIL BLAZERS" section we spotlight some of the best newer products and peripherals currently available for the Amiga.

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This famous super slim drive has now been upgraded to include Anti-click and virus checker - THE SECOND DRIVE THAT IS SECOND TO NONE
Phoenix price.........**£57.99**

PHOENIX 1Mb A600 UPGRADE



Simply the Best !
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CD ROM DRIVE-A570
This essential add-on has finally arrived, suitable for A500/A500+, A570 .
Phoenix price.........**£339.99**

STAR LC-100 COLOUR
9 PIN colour printer with paper parking, eight fonts and electronic DIP switches.
Phoenix price.........**£159.99**

A600 SMART CARDS
Utilise the advanced technology of the A600 Smart Card Expansion slot with these NEW RAM Expansion Cards direct from Phoenix. Available in 2 Mb & 4 Mb cofigurations.
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- PA 6040-4 Mb.........£149.99

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Don't confuse these quality disks with others currently available. 3.5" 100% certified error free 70% clip. All disks include **FREE** high quality Phoenix labels.

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25	£12.99	500	£174.99
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TDK Branded disks- High performance media from the experts-box 10 with labels.

10	£5.99	100	£52.99
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1000 Phoenix Disk Labels.................**£9.99**

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Please make cheques payable to PHOENIX. Allow 5 working days for cheque clearance. Call our despatch line for details on our full range of delivery options both in the UK and overseas. BFPO welcome. OPENING TIMES: Mon-Sat 9.00am-6.00pm E&O.E

continued from page 47

ribbon cable that comes out of the back of the machine. OK, it'll look untidy, but that's the only way of getting around the problem short of making some form of chassis for the drive inside the machine. ***JH***

ANIM REPLAY



In *Amiga Shopper* 16 you answered a query on how to run *DPaint IV* animations without having to load *DPaint* first by using the Player supplied with the package.

Can the same be done with *DPaint III*? If so, I cannot find the Player mentioned in the answer on my *DPaint III* animations disk.

C Glen
Enfield
Middlesex

Look again Mr Glen, and you'll find a program called Play. If you don't I'd question the authenticity of your disk, as it's certainly present on my *DPaint III* Animation disk. Run this program and you can load and play animations as you require.

Alternatively, there are a number of PD players such as *ShowAnim* and *View* which any good PD library should have. ***GW***

JARGON BUSTING • JARGON BUSTING

ANIM – A method of storing animation frames developed by Spartafilm, whereby only the changes between successive frames are stored, thus saving significant amounts of space.

ECS – Extended Chip Set is the name given to the new versions of the Amiga's custom chips which handle graphics and sound.

Library – Collections of pre-written programs that can be called from applications programs, saving each programmer from having to write routines to perform common tasks. Some are in ROM; some are loaded from disk as they are needed.

Printer driver – A program that sits inbetween any applications program producing output and the printer. It converts any codes describing text and graphics format into a form suitable for a specific printer.

RAM – Random Access Memory, so called because any part of it can be accessed immediately, rather than having to search through from the start of memory to the point of interest. RAM is used to hold programs while they are being executed and temporary data. The contents of RAM are lost when the power is switched off.

SIMM – Single Inline Memory Module, a collection of RAM chips in a package.

TERROR OF BLOCK 880



After reading your answer to Professor Craf's disk drive problem (issue 15 page 70-71) I contacted 316 Supplies from which I bought my Roctec drive only a month previously and told it that it was faulty. I have been having similar problems. The company was very efficient and immediately sent out a replacement and some blank disks to cover my postage. Now after only a few hours use it has also given me a write error in block 880 and the disk will not validate. Have I another faulty drive? Can I repair my disks? If it is a power supply problem will I make things worse by adding RAM? I recovered my files with *Last Hope* and it seems track 40 is totally unreadable.

Garry Hemming
Clifton
Nottingham

If your drive does the same thing with any floppy disk (to rule out a faulty batch of diskettes), then either your drive is faulty or your Amiga has a fault. Check out the drive on a friend's machine if you can, and if the drive is definitely faulty, send it back. ***JR***

COLUMNS IN THE NEWS



The main use for my Amiga 1500 Plus is production of a weekly newsletter, approximately 50 copies. The printer is a Canon BJ-300 bubble jet, using Canon's own driver.

The newssheet is two columns, but *Platinum Works!* does not support columns. Can you recommend a word processor that does support multiple columns? I have tried many PD word processors, but to no avail – *Uedit* looked promising, but doesn't seem to work properly on the Plus.

I know a DTP package will give multiple columns (I have *PageSetter*), but because this type of output is bitmapped it takes ages to print lots of copies. The BJ-300 prints 150 characters per second in LQ mode, so I want to use a character-based program for speed of printing. I don't need graphics or anything fancy, but support for embedded printer control sequences would be nice.

I have just started ARexx programming, since I recently discovered (in your magazine) that I have a copy that came with Workbench 2.04. Thanks for the helpful manual, Commodore! Can you recommend a book that will help me discover ARexx?

Kevin Ball
Batley
West Yorkshire

Multiple columns and support for embedded printer control codes spells one word: *Protext*. I recommend most strongly that you go for the latest version 5, rather than the much older and much cheaper version 4.

Kevin, have you considered making one master copy of your newssheet and then photocopying it? Nowadays, many High Street output bureaux are charging only about 3p per A4 sheet for 100 copies or more (Alphagraphics, for example – look in your local Yellow Pages), and I think you'll find that this works out cheaper than paper and ink for the bubble jet. And then you could use *PageSetter*!

To learn all about ARexx I'd recommend *Using ARexx on the Amiga*, published by Abacus. Also, look out for the ARexx series starting this month in *Amiga Shopper* on page 88. ***JW***

16MHZ 68000?



In your August 200 Tips special, you say it is possible to upgrade the processor by simply replacing the 68000 chip with an 8 or 10MHz 68010.

Is it possible to use a 16MHz 68000 in the machine, as I have seen one available? Would this be faster than a 10MHz 68010?

Alan Francis
Dunfermline
Fife

Yes, a 16MHz 68000 would be faster than a 10MHz 68010 – but no, unfortunately you cannot perform this upgrade. The Amiga has a 7.14MHz clock for the processor chip, and no matter what clock speed the chip you add, it will still clock at 7.14MHz. If you did put the 16MHz 68000 chip in, your machine would work fine – but at exactly the same speed. The 68010 chip is slightly faster than a 68000 chip at the same speed, which is why it works to drop one in as a straight replacement.

If you want to add a faster 68000 chip, you have to buy a special Turbo 68000 card, which has the necessary electronics on board to provide the faster clock speed and interface this to the rest of the Amiga. ***TS***

MODEM BASICS



Always on the look out for a bargain, today I picked up a Supra Modem 2400 and *KCom 2* from a boot sale for just £35 complete with boxes and wrappers unopened.

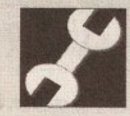
Getting home, I read through all of your Comms articles hoping to be educated on the subject, but found the basics somewhat lacking. Can you please answer me the following:

a) I see you only discuss two pieces of software, both presumably PD, and no mention of *KumaComm 2*. Does this stack up well against the other two?

b) You very kindly mention several bulletin boards in your articles – what about printing a list once in a while? It would be useful if you mentioned the cost of joining.

c) You talk about passwords, logging on etc, as though everyone is aware of what you are talking about. How about an idiots' guide,

68010 V 68000



Is it worth buying a 68010 10MHz for £15 instead of paying £45 for a Turbo 68000?

Bjorn Tidal
Sweden

The 68010 is a drop in replacement for the 68000 chip. Even if you get the 10MHz chip, it will still run at 7.14MHz, as that is the clock speed of the Amiga itself. The 68010 chip at 7.14MHz is slightly faster than the 68000 chip, especially in mathematical operations such as multiply and divide. Turbo 68000 expansions work by doubling the clock speed of the 68000 chip. This, in theory, doubles the speed of your Amiga, but in reality this is not quite the case. If you want a general across the board speed increase, it's probably better to go for the Turbo 68000 chip. If you can, wait until you can afford a 68020 chip. ***TS***

starting at the very beginning (or have I missed this copy)?
d) I have a hard drive so will have this attached to my Amiga when I get around to calling up my first bulletin board. Is there any danger anyone could "get into" my hard drive and can I catch a virus on it?
e) What on earth could an idiot like me upload? As you say, it is all very well downloading all the goodies you want, but as I am not exactly "Amiga literate" what can I offer in return?
f) In your last article, you mentioned how you would go about setting up your own bulletin board. As you may have gathered, this is the last thing on my mind, but what is to stop an enterprising reader with lots to offer using an 0898 telephone number, which would then earn him (or her) some revenue to pay back the outlay?

Peter Squires
Wickford
Essex

a) The two packages you mention (*NComm* and *JRComm*) are both excellent shareware comms packages which are being continually developed and improved. *KumaComm* is looking a bit dated these days and the shareware packages have the comms market pretty much sewn up. As you have *KumaComm* I would use that for now; it will have the facilities beginners need. At a later date you could get hold of a copy of *NComm* and compare the two to see which one suits you most.
b) A list of bulletin boards would be nice although we are a bit limited space-wise. I will try and give details of a few more though and hopefully we'll have space for a more complete list in the future. Very few boards charge for access and those that do are usually optional. Take a look at this month's comms article for a short list of Amiga boards.
c) An idiots' guide will be in next month's issue. It will feature a step by step guide to registering on a BBS and some hints and tips on downloading and other aspects of comms.
d) No-one can get at your hard drive if you are dialing them – not a chance. Viruses are a little more dangerous but you will only get them by downloading infected software and then running it. The majority of BBS sysops check the software available for download, but your best bet is to get an up-to-date virus killer and check all software before you run it. Viruses cannot come down the phone line on their own.
e) The best thing to upload is something you find useful. If you download a file from one board, and you find it really useful, go to a board that doesn't have it and upload it. If you try and visit a few boards regularly then you'll soon have a large collection of interesting programs to upload to boards that don't have them.
f) There isn't really anything stopping someone from doing that. Indeed, there are a couple of PC-based boards which do run on 0898 numbers where you can download shareware. The problem is that there are so many BBSs that the software is probably available on a free board somewhere anyway. Some boards charge a small subscription but the 30-50p a minute charge for 0898 numbers is far too much. ***PH***

SPECTRUM DRIVE

I have a 3.5" external floppy drive that I obtained to run with a Spectrum and an MGT Plus D interface. Now that I have upgraded to an Amiga I wish to utilise this drive as my second drive (DF1:). Could I obtain a cable and connector to connect this drive to my Amiga? If so, from where? And if possible could you advise me on the jumper settings on the floppy drive circuit board, to make it recogniseable by the Amiga.

Anthony Simpkin
Birches Head
Stoke on Trent

I doubt it. Although it's possible to convert an MGT 3.5" drive to run on the Amiga, it's really not worth the effort. I'd suggest you get a cheap external drive from one of the many suppliers who advertise in *Amiga Shopper* and sell your MGT drive and interface to another Spectrum owner. ***JR***

SPEED DEMON

a) Can 1Mb x 9-bit SIMMs in a hard drive be used as Chip memory after the infamous motherboard adaptation?
b) Is GVP (or anyone else) planning to offer upgrades to the new GVP A530 processor/hard disk combination to existing hard drive owners?
c) How does 32-bit memory co-exist with 16-bit RAM? Can you select which tasks run in what memory or is this handled automatically by the system?
d) Is there a decent, cheap IFF slideshow program available? The PD program *ShowWiz* is absolutely perfect but it refuses to work with my hard disk. *InstantSlideShow* on the *Deluxe Paint IV* freebies disk is OK, but it doesn't let you control wipes or save scripts and *Deluxe Video 3* is a bit over the top for just showing slides.
e) Is there a program available which can report on and do anything about hard disk fragmentation?
f) How can I find out what calls are supported by the ARP library, as I'd like to use its file requester within my own programs.
g) Is there a program available that will let me create or modify fonts larger than *Fed*'s 16x16 pixel self-imposed limit?
h) In *Amiga Shopper* 15 you quoted the price of Progressive Peripherals' 68040 accelerator for the A500 as £725. Was this a printing mistake or is it for real? How compatible is the 68040 with existing Amiga software? Will software optimised for the '020 and '030 work on it?
i) Will the ECS and an accelerator allow the memory inside my A500 to be expanded beyond 9Mb?
j) Is there a driver available for the Star SJ-48 Inkjet? The *EpsonQ* driver works well enough, but it doesn't allow you to print at the printer's highest resolution of 360x360 dpi.

Andrew Watson
Currie
Midlothian

a) No. I'm afraid the motherboard modification you refer to only works with 512K RAM expansions connected to the Amiga via the trapdoor connector.
b) Having spoken to the people at Silica Systems, they assure me that the idea is being looked into. As soon as I know more, I will pass the information on.
c) All 32-bit RAM installed inside an Amiga is handled by the processor accelerator, so it's kept separate from the Amiga's standard 16-bit RAM.
d) To be perfectly honest, I haven't yet seen a decent PD slideshow program. Your best bet is to treat yourself to a copy of *TVShow*, a brilliant commercial slideshow generator which is available from HB Marketing (☎ 0753 686000) for just £39.95.
e) Sure is. What you need is a copy of *QuarterBack Tools* which is available, once again, from HB Marketing on the number above.
f) I suspect that you've simply copied the ARP library from another disk. What you need is to get your hands on the official ARP distribution files which can be found within the Fish collection of public domain disks. These files include everything you need to know to be able to access and use all the routines within the ARP library including a couple of demos (one of which shows you how to use the file requester). The most helpful people I have found for Fish disk enquires are at George Thompson Services which can be contacted on ☎ 0707 664654.
g) Quite a few alternative font editors are available although my personal favourite is *Calligrapher* which is available, once again, from HB Marketing. *Calligrapher* is an absolutely brilliant piece of software that will even allow you to edit colour fonts.
h) The price of the Progressive Peripherals' 68040 processor card isn't a printing mistake!

Having played around with one already, I can guarantee you that it really does fly (even the base model is several times faster than a 25MHz A3000).

The 68040 is basically just a more powerful version of the '030 (which is in turn a more powerful version of the '020), so any software written specially for this processor will work with the '040 (only a lot faster!).
i) The Enhanced Chip Set alone won't enable your Amiga to access more than the usual 10Mb on an A500 Plus, but a processor card will.

I've already seen several adverts within the American press for processor accelerators which can address up to 129Mb of RAM (although 32Mb is more usual).
j) Following on from Canon and Citizen's lead, a little birdie tells me that Star has now produced a range of printer drivers for its printers including the SJ-48.

You can obtain these free of charge from Star on 0494 471111. ***JH***

continued on page 54

CLOCK GETS MY BACK UP

A I reset the machine after running *Superbase Personal* and now my battery backed-up clock in the A501 has stopped working. A message "Battery backed-up clock not found appears". I have checked the battery connections and so on, and everything seems to be OK.

JB Palmer
Warblington
Havant

It is possible the clock chip or Ni-Cad has failed leaving the machine without a clock. You can check the battery voltage with a high-impedance voltmeter – it should read 3.6V DC. It is more likely, however, that the clock has got "confused" in some way. You can reset it in software using the following Shell command:

```
SETCLOCK RESET
```

MS

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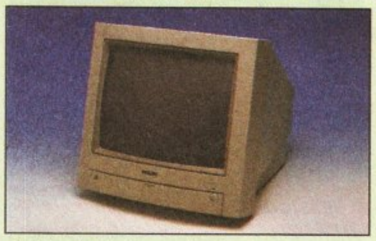
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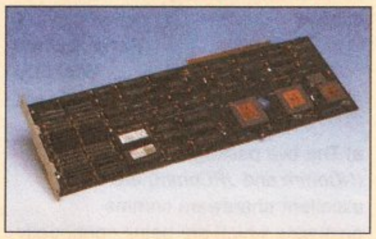
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GOOFY DPAINT

I seem to be encountering some compatibility problems with .anim files between *DPaint IV* and *Disney Animation Studio*.

For example, if I make up a small animation of six cells in *Disney*, save them to my hard drive, then load the same cells into *DPaint* all is fine. But when I save the six frames from *DPaint* as an anim and reload them into *Disney* all of a sudden I have eight cells, not six, with the first two cells being repeated at the end as cells seven and eight.

Strangely though, if I load the animation back to *DPaint* there are only six cells!

I've tried running *DPaint* in NTSC instead of PAL but this makes no difference at all. I've also tried saving the files from *DPaint* in expanded form, instead of the usual compressed format, but I still get the extra two cells in *Disney*.

I would be very grateful if you could solve this small problem as I would like to use the two programs in conjunction with one another.

SN Semley
Barnsley
S Yorks

There's a simple reason for your troubles... *DPaint* produces animations in a double-buffered, looping format, and to do this it needs to save the first two cells again so that the animation will loop smoothly.

As far as I know, there's nothing you can do about this in *DPaint* when you save the anim.

However, a straightforward solution would just be to delete the extra two cells after you've loaded the animation into *Disney Animation Studio*.

I'm curious as to why are you using both programs? Surely *DPaint IV* would be sufficient for all your needs? ***GW***

JARGON BUSTING • JARGON BUSTING

BBS – A Bulletin Board System is an electronic method of exchanging messages between large numbers of people. The name comes from the American College bulletin board (the cork and drawing pins type) which is a traditional meeting and trading place.

Bit – A binary digit, with a possible value of zero or one. It is the smallest unit of memory.

CD-ROM – Compact Disc Read Only Memory is the latest technology in storage devices. A CD can hold over 650Mb of data, compared to around 100Mb for a hard disk and 880K for a floppy disk. The big disadvantage is that users cannot store information on a CD, only retrieve it, but this doesn't stop CD from being a potentially revolutionary medium.

PostScript – A powerful mathematical language used to describe graphics and text images to compatible printers. Because it does not rely on a pixel system, objects so described can be scaled and rotated without distortion or loss of detail.

Zorro – The interface standard used by the larger Amigas to enable them to accept plug-in cards for expansion.

THE MARK OF ZORRO

I am thinking of upgrading my system to an A1500. In your last issue (17) you said that the machine was to be discontinued and replaced with two new machines using Zorro III expansion slots. My questions are about these slots.

a) The A1500 has Zorro II slots – can you use cards for Zorro III slots in the A1500?

b) The A500 has a Zorro I slot – can cards for this slot be used in an A1500?

Sean Kelly Onchan
Isle of Man

The Amiga 500 doesn't really have a Zorro I slot, it has an edge connector, which is more or less the same thing, except it is an 'edge' rather than a slot.

Zorro II was developed as the replacement in the Amiga 2000 to provide a better and more capable card-based system.

Zorro III is a 32-bit replacement for Zorro II. Unlike Zorro I/II which are incompatible, any Zorro II card will work in a Zorro III slot (like those in the Amiga 3000). Zorro III can access far greater areas of memory and transfer data far faster than the older Zorro II cards.

So where does this leave those users with older Zorro II slots? Well, so far I have only heard of one Zorro III specific card, a 64Mb RAM card. So if you can live with less than 64Mb of RAM in your Amiga, then don't worry about Zorro II. ***JR***

POSTSCRIPT PROBS

After reading your article in issue 17 about the Star Laser Printer 4II StarScript, I noted you were able to print (download) text in a font other than the 35 PostScript fonts resident in the printer.

I have a Star Laser Printer 8II StarScript, and I am unable to perform this simple task in PostScript mode, and have to print out in HP LaserJet emulation, although I have all the necessary software to download from *Professional Page 1.3*, which came with Gold Disk's *Publisher* series of extra fonts.

The download program works OK. The print requester works OK. The printing status window works OK. But the printer refuses to print anything, telling me that the job is 'undefined', or I get a message 'Fatal MV Ram Error' and I have to reset the printer and go into HP LaserJet emulation to print. The same thing happens when I use *PageStream*.

What I cannot understand is why it will not print any text from *Professional Draw 2.0* in PostScript, as I was under the impression that all elements in this program are of a structured form and *Professional Draw* does not regard type in any other way. To print from *Professional Draw* in HP LaserJet seems to take for ever, and I would like to use my printer's PostScript features most of the time. After all, that is what I paid the extra cash for.

Do you know of any reason, technical or otherwise, why I cannot achieve this?

I have contacted Star, who completely baffled me with science, so I remain none the wiser. Likewise I contacted Gold Disk's agents in the UK, who referred me to Gold Disk in Canada, but it has failed to reply to my enquiry.

JE Fisher
Chinnor
Oxon

You've neglected to mention how much memory you have inside your 8II, but the 'Fatal MV RAM Error' message sounds like the printer has run out of memory while trying to do the job. To print an A4 page in PostScript at 300 dpi you need at least 1.5Mb of memory in the printer; if you are going to download fonts as well, then you need 2Mb or more. That's memory *inside the printer* I'm talking about, not inside the Amiga.

Try cutting your page size down to A5 or smaller. If everything prints OK then it's almost certain that you have a memory problem. If the problem persists with A5, then I'm going to need many more details in order to find what you are doing wrong. You really need to send me a perfectly exact, step-by-step description of what you are doing, plus the exact wording of any error messages you get.

Star's implementation of PostScript – 'StarScript' – is not 100 per cent Adobe compatible (Adobe being the inventor of PostScript). Gold Disk's PostScript output is 100 per cent Adobe, and the PostScript files that come out of *Professional Page 3.0* are probably the most sophisticated PostScript output of any program ever written. Sometimes this 'perfection' causes problems with PostScript devices that do not implement PostScript fully or completely properly.

PageStream's PostScript output has always been a bit simple, and Soft-Logik has recently developed a new and better PostScript driver for it. If you are a registered *PageStream* user the best thing to do is write to Soft-Logik and ask for a copy.

I'd also recommend that you upgrade your software to the latest versions.

Professional Page 3.0 and *Professional Draw 3.0*, in particular, are much better than the old versions you are using. I regularly use PostScript output from these two programs, and rarely have problems. ***JW***

FAX OF LIFE

I have recently acquired an Amstrad FX9600AT fax machine which has a scanner output. At the time the machine was put on to the market (1990) no interface electronics were available from Amstrad, and the company did not intend to manufacture any.

Do you know whether a suitable interface can be obtained?

Paul Clarke
Upper Denby
Huddersfield

I'm pretty sure an FX9600AT interface hasn't been built for the PC yet, let alone the Amiga, and I wouldn't recommend you hold your breath waiting for one to arrive. ***JW***

CD QUESTIONS

I am a 14 year old student, and I have decided to buy an A570 CD-ROM drive for my 2Mb Chip RAM Amiga A500 Plus as opposed to the GVP 52Mb hard drive, and I have a few questions about the upgrade:
a) Does the A570 come with a SCSI interface so that I can plug in a bare drive without a controller?
b) How easy would it be to fit this hard disk? Would I need to take the drive apart, and therefore invalidate my warranty?
c) Where can I get CD-ROM software from?
d) Will Full Motion Video be available for the A570 later? Will I be able to sell my present A570 and buy a new one, or will it involve a simple replacement of chips?
e) I will also need another 2Mb of Fast RAM. Will the A570 itself cater for on-board RAM?
f) Are my choices the right ones? I do not want to throw away money, especially if no-one produces software for the A570.

J Sanders
Claines
Worchester

a) The A570 does not come with an SCSI interface. Commodore produces a SCSI plug-in card which should be available by the time that you read this for around £100.
b) It should be relatively straightforward. You will not need to open your A570 case, as the drive fits externally. The SCSI card plugs into a special slot in the back of the unit which is compatible with the one on the back of the CDTV. You unscrew the back plate and insert the SCSI card enabling you to add external SCSI drives. This is the easy bit. You will, however, need a power supply for the drive as the Amiga PSU will not be able to supply power to everything. It is also advisable, for safety's sake, get a specially made external SCSI device case – these are available from a number of manufacturers quite cheaply these days.
c) It's actually CDTV software you will have to buy. If you buy CD-ROM software, although you will be able to read what is on the disks, you will not be able to use the information. CDTV disks are now available from a number of dealers and high street electrical chains such as Dixons. Alternatively, it is possible to get CDTV software through mail order.
d) Full Motion Video (or FMV) is not available for the CDTV currently. CD drives are quite slow, managing around 100K a second transfer rate, and considering a HAM picture is around 80K, this is not many frames per second. The trick is using special compression techniques such as M-PEG or J-PEG, all of which are tediously slow in software, although there are some new lightning fast hardware solutions to these problems. The CDTV can manage quarter screen motion video currently. It is unlikely you will see FMV on the CDTV for a while yet, but as soon as the J and M-PEG chipsets drop in price, it is feasible that someone will produce an expansion card for both CDTVs and A570s.
e) The A570 supports 2Mb of Fast RAM on board.
f) This depends on what you are going to do, to be honest. You cannot write to a CD, consequently, if you use a lot of applications software such as wordprocessors, and paint packages, you are probably not going to gain anything from a CD drive until you add a hard disk too. If you do any programming, I would wholeheartedly recommend a hard disk and more memory rather than the CDTV drive. CDs are very powerful, and store upwards of 600MB of information – and there are some stunning software titles available for it now, and under development at the moment. ***TS***

WHICH BOARD?

I am considering buying a modem, although I am unsure about several things.
There would be no use buying a modem without knowing any BBSs. Do you know of any that have started up in Ireland, preferably locally?
Most decent BBSs seem to be in England. What would the price of a telephone call to one of these boards be?
What exactly are modem traders? I hear it a lot although I haven't got a clue what it means.
Do you have a favourite BBS?

Mr Bean
Warrenpoint
County Down

One very good BBS in Ireland is Yukon Ho! on ☎ 0232 768163. It's based in Belfast and is always very busy. I'm sure the sysop will be able to give you some other Irish board numbers if you give him a ring; remember to mention *Amiga Shopper*. The price of a call to England from Ireland will be exactly the same as a long distance call within Ireland, check with BT for the exact price.

Modem traders are people who illegally trade pirate software using modems. These are the sort of modem users who give comms a bad name, and you should avoid them at all costs.

My favourite BBS is End Zone (☎ 0524 752245), mainly because of the friendly sysop and the wide range of software that's available. I also enjoy visits to Chiba City (☎ 0501 44262) and Guru-10 (☎ 0738 52063). ***PH***

LICENSED TO MODEM

I would be grateful if you could help with a few modem details. Is it true that:
a) FAST (Federation Against Software Theft) watches and traces downloaded software?
b) FAST has a 78% chance of closing all BBSs?
c) You need a modem licence?
d) FAST pays you visits to check your modem is being used correctly?
e) Phone rates don't apply?
What do you think of the Eurolink, Hyundai, Supra 2400 and Supra 2400 Plus modems?

Paul Schofield
West Basildon
Essex

a) FAST does not "watch" downloaded software. It does sometimes investigate BBSs which it thinks are home to illegal activities, namely pirate software.
b) FAST will only close down a board if it houses pirate software; the majority of boards are in absolutely no danger of being closed by FAST.
c) No, you don't need a modem licence.
d) FAST doesn't pay you visits to check your modem, it is not concerned with your modem, only pirate software.
e) Phone rates definitely do apply. Phone calls made using a modem cost exactly the same as a normal call.

As far as the four modems you mentioned go, I would recommend the Supra 2400 Plus. It is very similar to the others but includes data compression which will speed up downloads of uncompressed files. ***PH***

PLUS STATUS

In your March issue you mentioned that an A500 board could be upgraded to 1Mb of Chip RAM on the mother board. In the May issue of *Amiga Format*, page 212, I read that it is possible to upgrade an A500 to that of an A500 Plus if you have revision 6 or 7. As you can see I have already made the changes on the mother board revision 6 for 1Mb of Chip RAM. My question is – can I add the four chips, four capacitors, ECS Denise and a 2Mb Agnus to the mother board to make this upgrade or are there other changes to the mother board that I would need to do? And if so, will my Supra A501 clone work giving me 1.5Mb of Chip RAM until I can find a 1Mb expansion board over here? Thanks for a great magazine. I just started reading it in Febraury and wish I'd found you sooner.

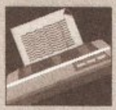
Scott Tracy
Brooklyn Park
Minnesota

I'm afraid not. The A500 boards can't be upgraded to 2Mb Chip RAM in that way, you will need to get the DKB Mega-Chip board which will add 1Mb of Chip RAM and the 8372B-HR 2Mb Agnus chip to the Amiga 500/2000 or CDTV. ***JR***

GREEDY FOR ANSWERS

a) I have an A500 populated with 2Mb of memory, an A590 unit with a 50Mb SCSI hard disk, and 1Mb of memory on the A590 controller board. The problem I have is that every now and then my machine will corrupt the screen (usually vertical lines). When eventually the Amiga can't take any more corruption, it freezes. On reboot the floppy drive is completely ignored and still the screen corrupts hideously. The only solution I've found is switching everything off, leaving it for about 20 seconds and switching back on. This would suggest to me that this isn't a heat problem, as everything is 99% of the time OK after the previous course of action. What I am wondering is whether the display chip (Agnus?) is faulty… The problem can happen at any time, it's not as if I'm doing anything processor-straining like running 20 applications at the same time, while attempting to Sierra dither a scanned hi-res image!
b) Every now and then I'll turn my Amiga on and the caps lock key will flash on and off steadily. The hard disk will boot as normal, mouse will work as normal, but the keyboard is locked. It's more than likely a faulty keyboard processor chip. Can you suggest to whom I can send my keyboard to get it rectified?
c) I have an early Amiga which has an American keyboard lay-out, but there isn't a pound sign to be seen. A friend did tell me that there is a

CHEAPER COLOURJET DRIVER



I have an Integrex Colourjet 132 printer. Now, twice people have written in wanting information on a driver for this great printer. You say it costs around £50. Not so. The address you have is correct, but it costs only £10 inc P&P.

Also it is very important to use the special paper, which costs £16 per roll. However I always use sensitised photocopy paper, and get first class prints; something to do with the ink not soaking into the paper and losing the depth of colour.

Cpl McFegan
BFPO

Integrex did indeed drop the price of the Colourjet 132 driver (on July 1 this year) to £10, although I hasten to add that at the time the previous details went to press, the £50 price was correct. Anybody who wants the driver, should contact Integrex on 0283 551551. ***JW***

hot-key to do this, but I can't for the life of me remember what.
d) Later on in the year I plan to part exchange my A500 for either an A1500 or A2000 (A1500 knowing my money situation!) and assume that the A1500 will have Kickstart 2.04 and Workbench 2. On hearing about compatibility problems I have become a little cautious, as I have many disks that all work well with my current system.

I have seen an advert for the Phoenix ROM sharer. Just how reliable are they? In short, would it solve the Workbench 2 friendliness problem? Commodore really should be ashamed of itself. When I had an ST I thought the STE compatibility problem was laughable, but Commodore's really cuts it. I use *Scanlab 100, Deluxe Paint IV* and lots of other programs and as a paying customer I expect all of these to function just the same with Workbench 2 as they do with 1.3.

While on the subject of the A1500, Could you please give a brief specification on it? I'm particularly interested as to whether my expensive A590 becomes obsolete or not.
e) I have a 50Mb SCSI hard disk sitting in its anti- static bag waiting to be installed, the problem being I need to daisy-chain it to my existing A590 unit. It's just a bare hard disk, so I need a case, SCSI data cable and a PSU, but I'm clueless as to what and how to go about it.
f) Is it feasible to use a standard parallel or serial T-switchbox for use with things like my MIDI interface and scanner, switching between the two as and when I need them.
g) I bought *Devpac 3* a while back because I saw the advert boasting a snazzy window environment. I was looking forward to learning to program assembler in a pleasing-to-look-at screen format. Ping! My dream disappeared. Just a dreary Workbench type display smiling weakly back at me. I tinkered about, even booted off the floppy; but still it smiled. Workbench 2 suddenly drifted across my eyes and I re-read the advert, but no mention of the fact that the screens shown were from WB 2. It even says in the manual that the display on 1.3 version is WB 2 like – yeah right! It's a terrific package, but I would rather have a soothing look to it all, it makes programming so much nicer. Am I doing something wrong or have I just been misled?
h) Weird dreams – just how the hell do you get past the nasty little girl in the garden? I hope you can help me with these problems. Cheers!

KD Ellis
Chelmsford
Essex

a) On the A590 problem, I'm afraid it sounds like a major internal A500 fault. It *may* be the Agnus chip, but it could be caused by a faulty RAM chip. I'd suggest that you get your Amiga checked out professionally (if you intend to keep it).
b) The keyboard fault is *very* common. This keyboard I'm typing on at the moment often does the same thing. It's a design fault in A500 keyboards. Some do this, others don't. I'm afraid you'll have to put up with it. Pressing down on the keyboard controller chip when running will often cure the problem (There's a place on the Amiga 500 keyboard that you can hit to cure this problem every time. A neat party trick, but not recommended!)
c) You can use the UK keymap and press Shift-3, or, if you keep the US keymap most software will print a pound sign by typing Left-Alt L.
d) As for ROM sharers, I personally don't use one, but I know several people who do, who have had no problems, although one of my colleagues at work managed to blow up his 2.04 ROM with one. I have a large collection of software, and I've found almost all of it works with 2.04. Nothing that didn't work I felt was worth spending the money on a ROM switcher for. I'd say use Kickstart 2.04 for a while, if you find you really need a switcher then get one. Make sure you plug in the chips the right way round though!

The Amiga 1500 is exactly the same as the Amiga 2000, it has five Zorro II expansion slots, a big case capable of holding lots of expansions including accelerators and flicker fixers, and a big meaty power supply that will power all your kit without problems.

At current pricing the Amiga 1500 is a real bargain, considering the expandability and reliability of the system you're getting. The Amiga A590 won't work in the Amiga 1500, but the Commodore A2091 card is an identical card for the Amiga 1500 which will control SCSI hard drives and also take the 2Mb of RAM from the A590. A SCSI drive formatted on the A590 can be transferred to the A2091 (or a GVP controller for that matter) without having to reformat.
e) Linking your 50Mb SCSI drive to the back of your A590 is expensive. External SCSI cases are expensive (around £120), plus you'll need a SCSI cable (around £15). Your best bet is to replace the internal drive with the 50Mb, unless you can find a cheap case with power supply in a junk shop or auction.
f) Many external devices, particularly samplers, don't work well through switch boxes, so it's not recommended. If you do buy a switch box, make sure it has all 25 wires connected through. Some cheaper boxes do not have all lines connected and do not work with the Amiga.
g) And you don't like how *Devpac 3.0* looks? Come on! If you want a nice flashy Workbench, then buy Workbench 2.04. Major commercial packages will stop supporting Kickstart 1.3 soon (many useful PD packages are already 2.04 only).
h) See a psychiatrist. ***JR***

JARGON BUSTING • JARGON BUSTING

Guru – A message from the Amiga system saying that a fatal error has occurred. The message includes two numbers which are of use to programmers trying to ascertain why their programs have failed.

Kickstart – The most basic and central part of the Amiga's operating system. These days it is held in ROM, so that it is immediately present when the machine is switched on.

MIDI – Musical Instrument Digital Interface is a standard devised by electronic instrument manufacturers, allowing a number of synthesisers to be controlled by a single keyboard or sequencer.

NTSC – National Television Standards Committee. This is the name for the TV colour coding system used in the USA and other countries. It has 525 lines, running at 60 fields aand 30 frames/second.

ROM – Read Only Memory is used to store essential programs, such as Kickstart and many of the library routines. These do not have to be re-loaded each time the Amiga is switched on because ROM retains its contents without power. No new information can be written to ROM, hence the name Read Only.

ROM sharer – A device which will hold more than one ROM (the chip in which Kickstart is stored) and enable the user to choose which version to use when the machine starts up.

WHAT THE HECK?



I would like to know where I can get an American (NTSC) version of the A520 modulator.

I require one of these because I have been given an NTSC composite colour monitor which I want to use with my Amiga 500 Plus. It runs happily at 50Hz but only shows the PAL video in black and white. Please help me – a proper monitor costs a fortune and our telly is really naff.

Stephen Conner
Kelvinside
Glasgow

Well, the obvious place to get the modulator is the home of NTSC – good ol' USA. Try looking in the adverts of an American magazine such as *Amiga World*. Alternatively, you could advertise in the *Amiga Shopper* small ads just in case there happen to be any US servicemen stationed here who might be able to help out.

One thing though – simply connecting an NTSC modulator to your PAL Amiga 500 won't solve the problem. You'll also need to force the Amiga to run at NTSC (60Hz) frequency. There are a number of utilities which can do this, such as *60Hz*, *PowerUtil* and *Degrader*, though I can't say whether all (or any) of your software will work correctly if you do this!

Contact a PD library for such programs. ***GW***

EMPTIES PLEASE



A short while ago I was looking for a printer. I was going to buy a Star LC24-200 but soon changed my mind as I read about the BJ-10ex and its superior graphics capabilities. What's more, I read that there was a colour upgrade available from System Insight. I obtained details of the upgrade and bought the printer.

According to the sheet I received from System Insight I needed three empty BC-01 cartridges. It also stated that it could supply me with pre-filled cartridges containing the different colours needed. When I was about to order the kit I checked with System Insight about the pre-filled cartridges, and was told that it did not do them as it could not get hold of any. I was told that the only way I could convert my printer was to buy three black cartridges, empty their contents into another container for future use, clean them out with the cleaning fluid provided in the kit, and refill them with the different coloured inks.

Obviously I want to avoid buying more black ink which I do not need, and cannot afford. So do you know of anyone who can supply me with some empty cartridges at a reasonable price? Or can any of the readers help?

M Solomon
35 Wentoworth Avenue
Wellingborough
Northants NN8 5PE

Sounds to me like all the BJ-10ex owners are keeping their empty cartridges so that they can refill them. System Insight's suggestion would appear to be the only solution, but if anyone has an empty cartridge to spare, how about helping Mr Solomon out? ***JW***

THE ECS TRAIL



Most program disks I have are protected by *Virus Stomper V2*, which informs me that "ECS Chips are Detected." On a friend's machine, six months older than mine, it does not do this, although the 50/60Hz register switch works as I have used it. Now, I have bought an Action Replay Mk III cartridge. When I type "CHIPREGS" it lists out all the register offsets and their names. Some have "ECS" after them, but I have no record of them. What are they, how can I find out more, and how can I get my programs to detect if "ECS" chips are present?

G Wilson
Holywell
Clwyd

It is highly likely that your friend's machine has only half of the ECS inside it. Commodore shipped Amigas with just the ECS Agnus chip long before it shipped them with the ECS Denise too. The reasons for this were that the Agnus chip allowed for 1Mb of Chip RAM, which was important with more modern graphics-intensive applications. You, on the other hand, have the full ECS chip set. The PAL/NTSC switch register you describe is in the Agnus chip, which is why it works on both machines.

The ECS registers are quite dangerous to use, and it is actually possible to blow up your monitor by tinkering with them. You can set some totally impossible video values using them and cause the display to lock. This can be a very expensive mistake indeed! I would not recommend tinkering with the ECS registers *at all*, as it is not necessary and you can cause genuine hardware damage. If, despite my warning, you still want to know about these registers, you can find information about them in edition three of the *Hardware Reference Manual*, published by Addison Wesley. This will also tell you how to detect if ECS chips are present. There are *better* ways of detecting the presence of the various custom chips – and they are legal, unfortunately you have to have 2.04 or above to use them. Under 2.04 you can examine the graphics base structure (which you get after opening the graphics.library) ChipRevBits0 which will have various flags set depending on which chips are present inside your Amiga.

In general you should avoid "poking" the hardware registers, as, should Commodore upgrade the Amiga range in the near future, then you might find incompatibilities. ***TS***

MAGIC OF GANDALF



I have recently acquired a second-hand modem for a tenner. It's made by Digital Comms Ltd and is called Gandalf LDS120A. The back plate contains...
LDS120A E STANDALONE
PN 3751ZZ
W/N 240V MOD404
L
Can I connect it to the Amiga? What lead will I need, and where can I buy one? What should the six dip switches be set to?

Ian Dutton
Erdington
Birmingham

It's quite probable that you can use this modem with your Amiga using a standard lead available from somewhere like Trilogic. As for the dip switches I would leave them as they are. The only way to be able to find out what they are is to get in touch with Digital Comms. ***PH***

BIG GURUS



a) I have an Amiga 1500 with a GVP Impact II HD controller with 8Mb of Fast RAM and a 52Mb Quantum HD, GVP Combo 33MHz accelerator with 4Mb of 32-bit Fast RAM and the new ECS and AmigaDOS/ Workbench 2. I have included a Sysinfo listing for the configuration.

The problem lies with some games and autobooting coverdisks. When I try to load them with the accelerator running, the disk won't boot up and I get a reboot or guru, usually 8000000B or 80000004, although I do get some others. I was wondering if it had anything to do with the Memory Management Unit on the accelerator as most of the games that fail are advertised as running on A3000s, and although the A1500 with accelerator isn't fully compatible with the A3000 I would still have expected the disks to boot. This means that I have to run BOOT68000 from Workbench, to disable the accelerator, then insert the disks to boot in DF0:.

b) I am using an Audio Engineer Plus II sampler connected via a parallel switcher. I use a set of phono cables to connect it to various audio equipment, but when I try to sample in stereo I get loads of noise. I've tried to adjust the bias control on the back of the sampler and put on the audio filter, but it doesn't help. I also tried connecting the leads to various outputs on my equipment from AUX outputs to headphone sockets. The noise is hardly audible when sampling in

WHICH HARD DRIVE?



I would like to purchase a hard drive and I was looking at the GVP Impact Series II type, because as far as I can tell this is the best. I have read that GVP is releasing this hard drive with an accelerator built-in, called the A530.

I would like to know a few things about the drive though, before I decide to buy it.

a) Does the additon of a hard drive allow you to run 3Mb programs eg *Vistapro* on a 2Mb machine, or do you have to add the SIMM chips to expand the memory?
b) Do the SIMM chips add memory to the Amiga or the hard drive?
c) The GVP A530 Turbo HD is able to take 32 x 1Mb – 60 and 32 x 4Mb – 60 Simm chips but will it also accept the 1Mb x 8 SIMMs that the standard GVP hard drive takes?
d) Does the GVP drive have auto parking heads, or do you have to do it manually?
e) Does the hard drive have a pass-thru connector enabling the addition of other hardware such as the Action Replay cartridge or do you have to remove the hard drive?
f) If you remove the hard drive, is the information stored on it lost, or is it retained for a period of time; if the latter is true, how long for?
g) If you decide to add SIMMs does it invalidate any warranty on the drive?
h) I have read that the A530 is 1Mb populated. Does this mean that it comes with 1Mb of SIMMs built-in?

Steven Innell
Stratford
London

a) You will still need to add RAM to your system to run programs like *VistaPro*. All hard drives give you is more storage space – you need extra RAM to enable you to run larger programs or run more programs at once. 3Mb of RAM is the minimum for a useable serious machine nowadays.
b) RAM added to the hard disk controller is used by the Amiga not the hard drive.
c) No, the GVP A530 will only take the expensive GVP 32-bit SIMMS.
d) All the current GVP hard drives autopark.
e) No, the GVP controllers do not have a through-port. The problem with through ports is that they are notoriously unreliable. You can buy an adaptor from Datel Electronics for £20 which will enable you to plug in both the Action Replay and the hard drive. The current Action Replay III has problems if you have more than 3Mb of RAM though.
f) Hard drives, like floppy disks, should retain the data on them forever, apart from your drive breaking down or you accidently deleting your data.
g) No. You can add extra memory to all GVP products without invalidating the warranty, although it is best to ask your supplier to fit them for you if you are at all unsure of how to do this.
h) The A530 has 1Mb of RAM chips soldered on to the board, so you can fit more SIMMS to increase this. ***JR***

mono, but it's still there. Could it be the leads I'm using or is it the sampler? If it's the sampler, could you recommend anywhere I could get it repaired? I bought it through Silica Shop in Sidcup on a special order (it doesn't normally stock it) and I don't think that it will be able to repair it.
c) Could you recommend a good AmigaDOS manual?
d) Finally, is it possible to connect the A570 CD ROM to a A1500 via a Zorro II slot or SCSI port? If not, do you know if Commodore is releasing one for the A1500/2000.

Kevin Breidenbach
Herne Bay
Kent

a) There's no reason why games that work on the Amiga 3000 should fail on your system. The only thing I can think of is that the speed difference between a 25MHz and your 33MHz system is enough to upset the timing systems in the badly-written loaders of some commercial games.
b) Turn off your monitor when sampling. Some monitors give terrible noise when used with the Audio Engineer. I found that by turning off the monitor I got perfect samples. Make sure that no power cables are near the leads and try to keep the box away from the computer.
c) It depends on what you want to do with AmigaDOS. I use the manual that comes with the Kickstart 2.04 Upgrade pack, which is really good. *The Bantam AmigaDOS* manual (3rd edition) is good too.
d) No, the A570 CDROM will only work in the Amiga 500. I have no idea whether CBM will release a version for the Amiga 1500/2000, but I hope it does. ***JR***

MIDI MATTERS



I have a MIDI keyboard and an Amiga 500 with a hard drive. All I want to do is to put the two together so that I can play on the MIDI keyboard, score the music, display and edit it as a musical score and then finally print it out on to paper (both clefs). Is there any such package that will do this? I've already heard of Dr T's *Copyist*, but I don't know where I can buy it. Can you suggest any alternatives?

GT Robinson
St Annes On Sea
Lancs

The first thing you need to buy is a MIDI interface to mate the Amiga and your keyboard together. These are available from most *Amiga Shopper* advertisers. Software wise, Dr.T's *Copyist* is about the best scoring package available for the Amiga. It's available from MCMXCIX which can be contacted on ☎ 071 258 3454. ***JH***

MULTIPLE CHOICE



I'm looking at the possibility of setting up a multimedia system and I'm considering purchasing an A600HD solely for this purpose because it is compact and has a hard drive already installed. I would also need to connect a digitiser to this (probably Vidi-Amiga) – is this possible with the A600 or would I have to digitise using my A500 and copy the results to my A600?

Could you advise me which multimedia package I should buy? My requirements are as follows:
- **It must be able to use HAM and 32 colour IFF images, with on-screen text.**
- **It must contain a variety of coloured and easy to read fonts, preferably outlined and available in different sizes.**
- **It must be able to handle *Deluxe Paint IV* animation files.**
- **It must be completely mouse/trackball driven. I would prefer if the user need never come into contact with the keyboard while the screen is running.**
- **It would be advantageous if the package provided screen transitions accompanied with a variety of wipe/fade effects.**
- **It would help if there was control for external procedures written in AMOS so that I could scroll screens and include Bobs in my presentation.**

Over to you, Shopper Guru.

JA Owen
Holyhead
Gwynedd

As you aren't saying just what you intend to do with this multimedia system of yours I'm left a little in the dark. However, if you think that a 20Mb hard disk (as fitted in the standard A600HD) will be enough for your application I would seriously ask you to reconsider. As soon as you have a few programs, fonts, graphics and animations on board you'll soon run out of space and you'll wish you'd been more sensible and got a bigger hard drive.

Even by compressing your programs, hard disks fill up unbelievably fast, however ruthless your management of them might be. On the other hand, if the A600HD is to be a stand-alone information centre, for instance, then 20Mb may suffice. An obvious alternative is to add a reasonably sized HD to your A500 – such as a GVP 52Mb, or see if you can buy a second-hand Amiga 1500 complete with hard drive. Of course, there's always the possibility of using a RAM card in the PCMCIA slot, but these aren't in evidence yet.

Enough of the hardware problems and on to the software. I would have no hesitation in recommending *Scala VideoStudio 113* (which used to be *Scala 1.13*). Although it can't communicate with AMOS and use Bobs, it can scroll screens and use brushes, and it does everything else you ask for, and plenty more. OK, for constructing presentations it's not *entirely* mouse driven – but for my money there's nothing to touch it for power and flexibility, as well as ease of use. From a user's point of view, the presentation can be controlled completely by the mouse, so I think *Scala* is your best bet. It comes with a good selection of typefaces, wipes, backgrounds and other options and certainly represents good value for money.

Don't forget you'll also need to add at least a couple of megs more memory to the A600 if you want to play back reasonably sized animations and for *Scala* to be completely functional.

Lastly, the people at Rombo tell me that its new Vidi-Amiga 12 will work with the A600 and connects to the computer's parallel port and external disk drive port. It should be out by the time you read this and, of course, we'll have a review as soon as possible. ***GW***

2MB CHIP RAM?



I've just sent my 500 away to ACS Electronics for upgrade to WB 2.04 and Kickstart 2 (after making adjustments to the motherboard I already had 1Mb Chip RAM) but one thing I can't work out is what expansion I need to take it up to 2Mb Chip? A 1.3 upgrade or a 2.04 upgrade board? When my machine returns it will have both Kickstarts fitted in a ROM sharer. I will also obviously need a clock fitted to the expansion board. I haven't seen a need to have the Super Denise fitted. Will this affect the conversion in any way?

A Rae
Northallerton
N Yorkshire

To upgrade to 2Mb of Chip RAM, you will need the DKB Meg-A-Chip board, which costs around £199 including the extra 1Mb of RAM. For the clock you will probably have to replace your 0.5Mb expansion for an expansion with a clock; I've not seen anyone selling the clock separately. ***JR***

MISSING BITS



I have a couple of very serious problems with *Professional Page 2.1*, both involving fonts. My system is an Amiga 2000 fitted with a Solid State Leisure B5000 accelerator and 11Mb of RAM – 1Mb Chip, 8Mb Fast, 2Mb 32-bit RAM on the B5000.

I have been trying to print out fairly large characters for various posters and signs that I have been asked to do, typically letters and numbers between 500-700 points. Some are rotated on the page, all are solid filled black.

Everything is fine on-screen at all magnifications, as is printing out at resolutions up to 150 dpi. However, when I try to print the final versions at 300 dpi, everything goes disastrously wrong! All that gets printed are the outlines of the

continued on page 60

JARGON BUSTING • JARGON BUSTING

AmigaDOS – Part of the collection of programs in the operating system that take care of the general running of the machine. AmigaDOS concerns itself with device-handling: control of the keyboard, basic screen output, disk drives, printers and so on.

Chip RAM – The area of the Amiga's memory directly accessible by the custom graphics and sound chips. Originally a maximum of 512K, newer machines fitted with the fatter Agnus graphics chip can access 1Mb, enabling smoother animations and more screens to be displayed at once. The new A600 comes with an Agnus chip capable of addressing 2Mb of Chip RAM.

Fast RAM – Any extra memory which is not Chip RAM. The custom chips cannot access it; since such accesses to Chip RAM can block out the central processor and slow down its own accesses, Fast RAM is faster.

HAM – Hold And Modify is an Amiga graphic mode allowing all 4096 colours to be displayed at once, with certain restrictions.

IFF – Interchange File Format is a means by which data from different graphics or sound sampling programs are saved in a compatible way. It allows data to be exchanged between programs very easily.

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Commodore A2320 Display Enhancer	p&p £2	£219.00
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boxes on the page. Sometimes I get just parts of the page printed out, but with it being badly corrupted – that is, text not where it should be.

Is this rather serious bug present in *Professional Page 3.0*? If it is – or at least if you are not sure – will buying a PostScript laser printer solve the problem?

Now to my second problem. Recently there have been a number of companies offering disks of cheap Compugraphic typefaces. I jumped at the chance of more typefaces, and bought both Volumes 1 and 2 from George Thompson Services to add to my collection.

Unfortunately, after copying all the fonts to the CGFonts: assigned directory of my hard drive, and running the supplied 'CGUpdate' program, I find that I am unable to use them all. The Select Typeface requester gives me a maximum of only 64 typefaces to choose from, excluding Bold and Italic font variations, but there are at least 85 typefaces in my CGFonts: directory. Help! Is this a bug or serious limitation with *Professional Page 2.1*, or have I done something wrong? If the problem is *Professional Page*, will version 3.0 allow more typefaces to be used?

Stuart Davis
Langley
E Sussex

Your first problem is well known. Both *PageStream* and *Professional Page* are notorious for this problem. Blame has been thrown about all over the place, from AGFA to Soft-Logik to Gold Disk to Commodore… but at the end of the day it appears to be a bug in AGFA's Compugraphic format.

The problem was more marked in version 1.3 of *Professional Page* (and *PageSetter II*), which used an earlier implementation of the Compugraphic format and where you couldn't guarantee the dot-matrix output of any font much over 90 points.

AGFA was supposed to have fixed it, but I find that things start going awry at about 250 points at 360 dpi in *Professional Page 3.0*. The *Pagestream 2.2* Addendum manual acknowledges the problem, and says it happens to Compugraphic characters approaching one inch tall.

The solution, as you have guessed, is a PostScript printer; the problem will completely go away.

But if you are going to buy a PostScript printer keep in mind that you'll need at least 2Mb of memory inside it, and that Adobe PostScript will be a safer bet than any particular manufacturer's 'compatible' implementation.

I had no idea that *Professional Page 2.1* had a 64 typeface maximum in the requester; there's nothing in the manual about it and I don't have my old version any more so I can't check it out.

I've been using version 3.0 for some time, and I have more than 200 typefaces in CGFonts:, all of them listed in the Typeface requester, so if it was a limitation, it isn't any longer. ***JW***

JARGON BUSTING • JARGON BUSTING

C – A compiled language designed primarily for systems programming. It was used to write much of the Amiga's operating system, and is used in the writing of many Amiga applications.

CAD – Computer Aided Design applications provide designers with the graphical facilities to design buildings, circuit boards, and so on.

Compugraphic fonts – Rather than a simple bit-mapped image of each character, which grows more jagged with magnification, a Compugraphic font represents the shape of each character within as a mathematical equation. Consequently, as the magnitude of the character is varied in printing, no information is lost and the result always looks smooth.

Digitiser – A device which takes the analogue information taken by a source such as a video camera and converts it to digital screen information for use by a computer.

Serial port – An interface port at the back of the Amiga, used mainly for connecting to a modem for communications purposes. Sometimes used for printers. With the serial port, data is sent one binary digit at a time (one eighth of the speed of the parallel port, which is more usually used for connecting to a printer).

GERIATRIC WORKBENCH



When trying to run *PowerPacker* it says that my version of Kickstart and Workbench are not high or new enough. As Kickstart is loaded from disk on the A3000, can you tell me where to get the latest version? My current version is Workbench 2.00 and Kickstart 46.68.

MJ Harnden
Stamford
Lincs

Good grief! That is a very old version indeed. The current release version of Workbench is 2.05, which is Kickstart 37.175 on the A3000, and Workbench 37.67 or higher. Your dealer will be able to provide you with the upgrade you require, or as a last resort you could ring Commodore and grovel to the people there. ***TS***

ACCELERATOR QUEST



Can you tell me the cheapest price of a 68010 CPU, 8 and 10MHz versions, and the 68020 board, and where I can get them from?

Daniel Simpson
New Cubbington
Leamington Spa

Firstly, it does not matter whether you get an 8, 10, 14 or 16MHz version of the 68010 chip, as regardless of this it will run at 7.14MHz. The 68010 processor at 7.14MHz is slightly faster than the 68000 chip at the same clock speed. 68020 boards start at around £200. It's best to talk to your local dealer about which accelerator might be best for you. I would recommend that if you are planning on spending more than £200 on this that you look at boards from GVP's excellent range. ***TS***

FACTS ON FAX



I've been wanting to buy a modem for ages and now have the money to buy one. So I bought *Amiga Shopper* knowing there would be something in it about modems.

I came across the new Supra Fax Plus modem with up to 9600 bits per second. I want to know whether, when my computer is off, the fax modem holds the information till I call it up. I also want to know everything and exactly what the fax facility does. Eg: if I'm on the modem using it, can the phone still be used, ie receiving calls or dialling out (we only have one phone plug, but we have got an adaptor that splits one socket into two).

I would appreciate this information and any other information I need to know about the fax modem before I buy it.

Tristan Boger
Aberdeenshire

Firstly, the Supra Fax Plus is an excellent modem, well worth the money so you've made the right choice. The fax part of the modem will only work when the computer and modem is turned on and running some software (which should come with the modem). When someone wants to send you a fax the phone will ring just like any other call but if your modem is on the line, and the software is running, it will answer the phone and receive the fax.

If you are using the modem on a phone line, either dialling out or receiving a call, the line can't be used by anyone else. It's exactly the same as phoning your friend; someone else can't use a different phone on the same line to call someone else at the same time. The splitter you have will enable you to keep your modem and a phone plugged in at the same time, but that's all.

Essentially, modems are just like a normal phone, they work in similar ways, and cost the same to use. ***PH***

DTV ON THE PC?



I have decided that a computer would help me in my various hobbies (as well as being a hobby in itself). Being new to computers, apart from some interesting times with a ZX81 when they first came out, I am unsure what is best for my applications, a PC or an Amiga. Here is a list of my requirements…

a) I need a card file system to list and locate magazines, possibly a 'keyboard search' facility.
b) A card file similar to point (a) but for handling 32mm slides.
c) A word processor for letters and reports to a club magazine.
d) A facility to draw and print out engineering and electrical/electronic drawings for hobby use.
e) The ability to produce 3D drawings and view them at different angles.
f) I also want to be able to scan in magazine articles so that they can be read from the monitor screen rather than from the magazine. It would be nice to be able to link this in with the database program mentioned in point (a). Is it possible to use a camcorder for this rather than having to spend out £100 or so on a hand scanner?
g) I also want to title home videos and possibly dissolve/fade/wipe/

superimpose titles over the top of an image. I understand that I will need a genlock for this.
h) A video editing suite such as Syntronix *Editman* or *VideoPilot*. Are there any cheaper alternatives available?
i) Animation and morphing which can be downloaded on to video tape. I suspect that the hardware required to do this will be expensive.

I have been involved in home video production for some time now and I regularly buy video magazines. Although they all seem to mention the Amiga and Maze Software, none of them mention the PC. Reading the specs of the Amiga and PC, it seems to me that the PC is the more powerful machine as a similar priced PC has a faster processor. I have also been told that the Amiga needs lots of extra RAM and a processor accelerator to handle the sort of tasks that I've detailed above. Is this true? Finally, do I need a monitor for the Amiga or will a TV suffice for the sort of applications that I've detailed?

D Wild
Woodley
Stockport

Having analysed your requirements, it seems pretty obvious to me that the Amiga is your only choice. Although the price of PCs has dropped substantially, the cost of the software and hardware that you will need to run the sort of applications that you have mentioned is astronomical on the PC. Take genlocks for example – a pretty well endowed Amiga genlock can be picked up for under £100 these days whereas PC genlocks are still a couple of hundred pounds for even a very basic unit.

Sure, the PC has a faster processor, but the Amiga's processor is more than adequate for your requirements. You really don't need to splash out on a processor accelerator unless you plan on getting involved in heavyweight DTP or 24-bit graphics work – whoever told you that you need a processor accelerator to word process on the Amiga needs shooting! Anyway, here's a list of the sort of products you should be looking at based on your requirements.

a) The vast majority of databases will handle your first requirement with both hands tied behind their backs! Even a public domain database such as *AmiBase III* will be more than adequate.

b) Unless you actually intend storing the slides in graphical format, the same database that handles requirement 1 will also handle this. If you need to handle graphic images as well, then something like *Super-Base Professional* is the best bet.

CASE FOR CONVERSION



In the June 1991 issue of *New Computer Express* there was a review of a case conversion kit for the A500 called the 'A1500' which was produced by a company called Checkmate Digital. This kit enabled you to strip the guts out of an A500 and fit them inside a solid steel casing which provided a separate keyboard and – more importantly – more room for expansion.

Since that date though, I have not seen the A1500 advertised. Is it still available? Alternatively, are there any other kits available of this kind?

Anon

As far as I'm aware, the A1500 case conversion kit is no longer produced. Instead, Checkmate (the company responsible for the A1500) has started to market a vastly enhanced version called the Hi-Q system based around an 'off the shelf' PC tower system casing. To be perfectly honest, I was never really that impressed by the original A1500 but the Hi-Q Tower is a totally different ball game altogether. It is far more expandable and actually looks quite nice (unlike the A1500!). Checkmate can be contacted on ☎ 071 923 0658. ***JH***

c) Unless you intend writing very large documents, any Amiga word processor will handle the task of writing letters and reports. Why not try *Kindwords 3*?

d) What you need is a CAD package. By far the best 'budget' CAD package available for the Amiga is *X-CAD 2000* from Digital Multimedia Ltd. It costs £129 and is available from DML on 081 977 1105. You may well be surprised to learn that *XCAD* running on a standard Amiga is faster than *AutoCAD* (the PC's top CAD package!) running on a 386 PC. Who ever said Amiga applications are slow?

e) *X-CAD 2000* will also handle this task too. The latest release of *X-CAD* includes a 3D modeller that lets you turn 2D CAD drawings into 3D objects.

f) Even on a PC, you'll need a video digitiser (costing around £100) to use a camcorder to 'digitise' the pages of a magazine into your Amiga. A much better bet is a hand scanner such as 'PowerScan 2' from Power Computing which costs just £99. Hand scanners produce a much more even scan than a digitiser.

g) The reason why video magazines don't mention the PC but rave on about the Amiga is simply because the Amiga is the best machine there is for this sort of work. The choice of video software available is second to none. If your budget is tight, I would advise you to buy the Roctec RG300C genlock which comes as standard with fade and dissolve controls. Better still, these are available for as little as £75 these days. Just check out the adverts in *Amiga Shopper* for the best deal. Software-wise, your best bet is *Scala 500* from Silica Systems.

h) The cheapest video editing suite I've seen for the Amiga is Gold Disk's *Video Director* package. This connects to most LANC-equipped video decks and cameras and virtually automates tape assembly. It costs £130 and is available from Silica Systems on 081 309 1111.

i) The best budget package available for animation and morphing is *Deluxe Paint 4*.

Once again, scan the adverts within this issue for the best pricing. Hope all this information helps you in your endeavours! ***JH***

2ND HAND MONITOR BLUES (PART 1)



Perhaps you can help. I recently purchased an Olivetti colour monitor (model CDU 1200) and wondered how to connect it so that I can use it with my Amiga 500. I have no manual and therefore do not know the wiring of the 25-way D-plug on the rear of the monitor, or what kind of lead I need.

I know you must get a lot of mail, but a personal reply would be very much appreciated. I look forward to hearing from you soon.

P Jones
Runcorn
Cheshire

Thanks to Olivetti's helpful and knowledgeable PC Helpline (☎ 0908 690790) I have some news which isn't going to please you, Mr Jones.

I'm afraid to say that the CDU 1200 was designed to work with Olivetti's MP24 PC and will only really function properly when connected to this machine, as it needs a proprietary controller to drive it correctly, being a CGA-type monitor. The highest resolution it could have (there were 2 different models) is 512 x 256, which wouldn't be particularly good with your Amiga.

Olivetti suggests that your best option may well be to advertise your monitor for sale in a PC magazine, as these monitors do still change hands. ***GW***

SHARED SERIAL PORT



A friend and I are currently writing a multi-user game in AMOS. At present we can successfully play with two users at one time having one on the Amiga and one on a terminal in the serial port. The question is, how can we have more than one user on the serial port, ie we want to have about 6-8 incoming lines all on modems. I've heard of this sort of thing being done on A1500s by use of cards but I've never seen or heard of such a piece of hardware for the A500. I hope you have a positive answer for this as I don't want to have to buy an A1500.

Matthew Walker
Reigate
Surrey

The Amiga 1500 can do this sort of thing with the Commodore A2232 multi-serial port card, which for under £200 gives you 7 more serial ports. You *may* be able to do something similar on the Amiga 500 with the *Ami-Net* hardware and software, available from Applied Systems and Peripherals, allowing you to link many Amigas up in a network. It's not fast, but it might be ideal for your needs. You'll have to work out how to program it in AMOS; it may be rather tricky without some machine code. ***JR***

PICTURE FORMATS



I am currently writing a graphics program in 'C' and need to know the format of bitmap and CG font files. It would also be nice to know the format for TIFF, GIF and other alien picture file formats. (I know the IFF ILBM format.)

Could you either briefly tell me about the font file formats or about any books which would help me to make use of them. A general book detailing many useful file structures (and system structures not detailed in the Intuition guides, etc) would also be very useful.

Tobin Darling
Whippingham
Isle of Wight

Unfortunately the information you are after is very extensive, and certainly beyond the scope of this reply. Even more unfortunately it's also beyond the scope of one book! Well, that's not entirely true, although to find information on TIFF, GIF and other foreign picture file formats you will need to buy a PC book about this. There are a number of publications available, some dedicated entirely to

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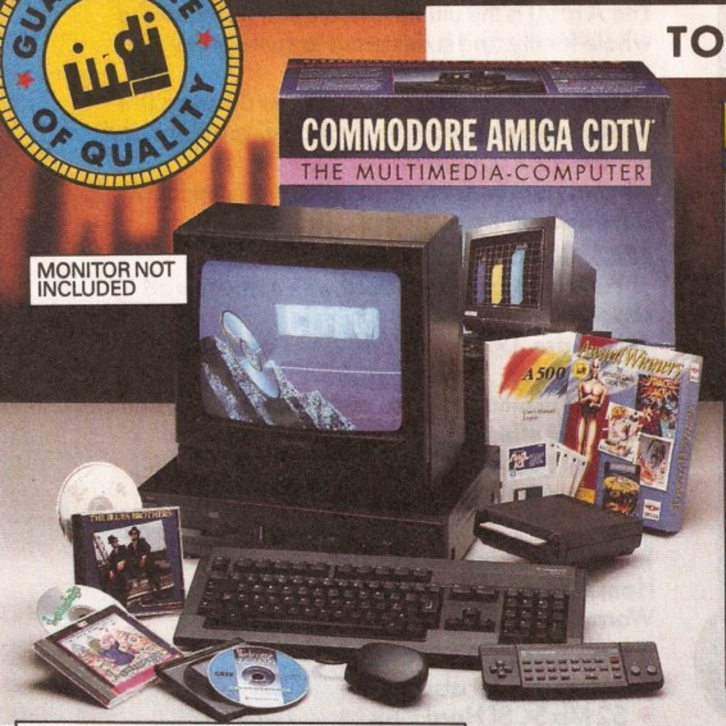
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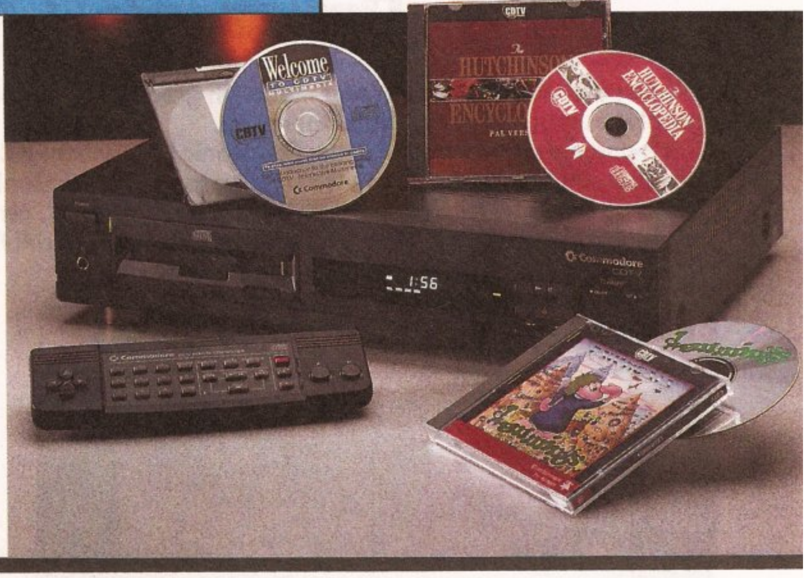
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We researched the colour printer market in great depth to find a colour printer good enough to cope with Amiga's powerful graphic output, yet at an affordable price.
We found the perfect printer in the Panasonic KX-P2180 + KX-P2123 quiet printers.
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- **Fast Printing Speeds** 192CPS Draft and 38 CPS NLQ
- **Colour Printing** 7 colour palette (blue, red, green, yellow, violet, magenta and black)
- **QuietPrinting** Super quiet 45-48dBa sound level (most matrix printers are typically in excess of 60dBA)
- **6 Resident Fonts** Over 6,100 type styles using Courier, Prestige, Bold PS, Roman, Script and Sans Serif Fonts
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Quiet colour printer offers leading edge quiet printing technology at an affordable price.

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- **24 PIN Diamond Printhead** High performance and high quality output
- **1 Year Warranty** for total peace of mind.

INDI PRICE **£229.99**

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file formats on the PC. This is likely to cost around £20-30.

The other book you need weighs in at a hefty £30, and it is the *Amiga ROM Kernal Reference Manual: Libraries* (Edition 3) published by Addison Wesley, and available from large book stores. It is worth every penny and is packed full of useful information of the sort you need to know. I am not entirely sure what you meant by system structures not detailed in the Intuition guides, but if something is not detailed in the official Commodore books, you're almost certainly not meant to know about it. ***TS***

NO LUCK WITH COMMS

I recently bought a Supra 2400 Plus modem. After connecting it up I tried using *NComm 1.9* to communicate with a few BBSs, but with no luck. I tried different protocols (XModem, ZModem etc) with no luck. I tried different baud rates and X settings using the AT commands, but still no luck. The messages I get are – no dial tone, no carrier, no answer or busy.

I even went through the problems check in the manual. But still no connection. The modem seems fine, ie: the TR light on the modem is lit so the terminal is ready. The MR light is lit so the modem is ready. The HS high speed 2400bps connection is lit so high transfer speed is OK. When I press any keys on the keyboard the RD and SD (receive data and send data) lights flash just as they are supposed to do.

Each time I tone dial or pulse dial a BBS the off-hook light flashes but the modem does not connect. The boards I phoned seem to be working from the beeps I hear. I've talked to the sysops who advised me on the settings required.

What am I doing wrong? Is it my modem, computer's serial port, phone line, cable or what?

Balvinder Bal
Wolverhampton

From the sounds of it, you've been doing all the right things. The cable between modem and Amiga seems to be OK because you are able to communicate OK with the modem. The messages you are getting mean exactly what they say. 'No answer' or 'busy' mean that the other modem didn't answer or the line was busy. 'No dial tone' means that the modem couldn't hear the dialling tone when it tried to dial.

There are several things you can do. First, turn on the modem's speaker and listen as it tries to dial out. You should be able to hear the dialling tone and then the result after the modem has dialled. The tones you hear are the same ones you get from a normal telephone so you'll recognise the engaged tone or hear it ringing.

If the other end doesn't answer you'll get a 'no answer' message after a while. If it does work, you should be able to hear a series of screeches, which your modem should answer. Once it answers, you should be connected.

If your modem doesn't connect properly then reset your modem to its default settings and try again without changing anything. This should let you get a connection of some sort.

Another check you can try is to arrange for someone to call you. Set your modem to auto answer and then when they dial you, the modem will answer and you should be able to type directly to the person calling you. This will prove that the modem is working properly. If none of this works, I suggest you take the modem back and change it for a new one. ***PH***

HARD DISK FAILURE

I have recently purchased an Amiga 1500 with Workbench 2.04. The computer is fitted with a Quantum 52Mb hard disk, controlled by a Nexus board which is fitted with a 4Mb RAM expansion. After using the software supplied with the Nexus board to install Workbench on the hard disk, I have come across two problems which seem related. Firstly the computer occasionally fails to boot up from the hard disk complaining that the IPREFS program failed, giving the error code 8000 000B. The second problem is that software which has been installed on the hard disk such as *Deluxe Paint* and *Wordworth* fail to run giving an error message of 8000 0003. Programs supplied with the computer such as Blanker and clock also fail with the same error code. This is very frustrating as it means that the hard disk is almost useless.

Tim Barnett
Gt Sutton
South Wirrall

It sounds like there is some bad software in your system, either a virus or a utility that doesn't work under Kickstart 2.04. I suggest you scan your hard drive with a recent virus killer, and make sure you have nothing else running other than the supplied Commodore software. If this fails I would suggest taking the Nexus card and memory back to the place you bought it and have it checked out. ***JR***

GHOST DRIVE ICONS

I own a Roclite external drive (model RF332C). Whenever I boot up Workbench with the drive plugged in I get two extra disk icons on the right with the description "DF2:BAD" and "DF3:BAD" under each icon. I know that this particular drive supports daisy-chain but as I have no other drives attached to it I am baffled as to why the two icons appear. I think that the problem may lie in the mountlist but I am not entirely sure. Is there a way of getting rid of these icons or is it just something I have to put up with?

Hakan Guleroglu
Manor Park
London

This is a fault with your floppy drive; it's probably a bad connection in the cabling. Take it back and ask for a replacement. You should not get DF2:BAD and DF3:BAD icons on your Workbench. ***JR***

CAPS LOCK FLASHER

Having been an Amiga 500 Plus owner since Christmas, I would appreciate your help on the following points.

a) When I switch the Amiga on, the light on the 'Caps Lock' key momentarily comes on for about a second. Does this mean that my keyboard has developed a fault?

b) We purchased the Amiga plus a Philips CM8833-II monitor with the product code 10G. After reading your July issue, I inspected the mains lead supplied and found that it has a positive, negative and earth line. Does this mean it is safe?

c) I have tried unsuccessfully to drag the 'Blanker' program on the Workbench 2 disk across on to my *Wordworth* program disk but the Blanker refuses to run from this disk. Why is this? Alternatively, is it OK to simply switch the monitor off if you want to leave a program such as a game running?

John Dorman
Sevenoaks
Kent

a) Don't worry John, the light on the caps lock key is supposed to flash when the machine is turned on. This is simply the Amiga checking to make sure that the keyboard is OK.

b) If your monitor has an earth line, then you can be pretty sure that it is a full UK-spec unit. As yours does, it is perfectly safe.

c) The Blanker program on the Workbench 2 disk runs under Commodities Exchange, so you'll also have to copy across the 'Exchange' program and the Commodities library in the LIBS: directory for the Blanker to work. Switching off your monitor whilst the machine is still running is perfectly safe and will actually protect the screen from 'burn in' a lot better than the Blanker program. ***JH***

2ND HAND MONITOR BLUES (PART 2)

I have just acquired a Cotron 51 20" monitor from a second-hand shop and although it is probably designed for an IBM do you think that it could be used with an Amiga?

I do not have a lead to test it with, so could you tell me where I could buy one which would connect my Amiga 500 to the monitor's 15-pin D-socket?

Peter Conroy
Llandudno
Gwynedd

Here we go again. I'm afraid that having a 15-pin connector means very little, unless you know how it's wired up, which is why you're asking me. But no luck this time as I haven't been able to track down Cotron, so I can't tell you anything about this monitor at all. Sorry. ***GW***

SEGA CONTROLLER

I recently inherited a Sega Megadrive control pad, and I have been trying to use the extra buttons to control a game I am writing, but the only luck I have had is by using the pad in the mouse port with joy (o) commands for movement and mouse key commands for key presses which gives me two buttons (B+C) plus the four (or eight) directional movements.

Obviously I can't use the joystick device in my programs because that only reads five pins from the joystick, but is there any other way I can read the other pins by some routine, even if it means using assembly language?

Although using the extra buttons on a Megadrive control pad might seem like a minor programming problem, the ability to use a joystick port for any alternative input device, such as a lightpen, trackball or paddle could

have enormous potential in utilities and games. I see this as one of the only omissions in an otherwise excellent utility.

Andrew Appleton
Oregon
USA

Unfortunately I've been unable to find out how the Megadrive controller pad is wired up. The information is in the *Megadrive Hardware Manual*, but this is only available to registered Megadrive developers.

I doubt any controls other than the fire buttons and the directional controls can be accessed through the Amiga hardware, as the mouse/joystick ports are already packed with inputs for mice, proportional joysicks and light pens. ***JR***

EDUCATION ON THE CHEAP

I am a lecturer in physics and maths at a Birmingham Further Education college, and use my Amiga for the preparation of notes and hand-outs. Currently, the Further Education sector is moving towards the provision of open and flexible learning packages, which require a higher level of presentation than my current system – an ancient Amiga 500 with, believe it or not, *KindWords* – can produce.

As a result I will be upgrading to one of the new generation of Amigas when they are released, *Wordworth* and a DTP package – probably *PageStream*.

Due to the specialist nature of my subjects I require scalable typefaces giving me the full Greek alphabet, mathematical symbols, and astronomical symbols. I should also mention that the output will mainly be from the college's PostScript laser printer, and so bitmapped fonts are of no use. So my questions are as follows:
a) Can you recommend any Compugraphic outline or Adobe Type 1 fonts in the public domain?
b) The best scientific fonts I have used were those for the TeX and LaTex scientific typesetting systems. I have a copy of the LaTex MetaFont source code (from Fish disks 486 and 487). Do you know of any PD program which could convert these MetaFonts to Compugraphic or Adobe format?
c) Do you know of any PD utility which will convert Adobe Type 1 fonts to Compugraphic outline fonts which can be used with Workbench 2.x? I know that the new version of *Professional Page* has a utility to do this, but I believe that *PageStream* is better suited to my needs.

ND Tromans
Birmingham

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Baud – The number of possible changes in state per second on a transmission line. For simple protocols such as V21, V22, etc, there are only two possible states, so baud rate is equivalent to a measure of bits (binary digits) per second. V32 makes use of many more possible states and clever coding techniques meaning that many more bits per second can be sent at the same baud rate.

Font – The group of letters, numbers and special characters that comprise one variation of typeface, eg: 12pt Times, 12pt Times Bold, 12pt Times Italic.

Icon – A graphical representation of a file. Placing the pointer over an icon and double-clicking on the left-hand mouse button will result in the corresponding file being opened.

MHz – Mega-Hertz is a measurement of frequency, meaning millions of times per second. Used to measure processor speeds.

Virus – A small program that can lie hidden in memory or on a disk, duplicating itself on to any disks inserted in the machine, and generally causing havoc. There are many virus killers available in the public domain designed to deal with this menace.

a) Check out the adverts and speak to one of the companies which are peddling these PD and shareware Compugraphic and Adobe Type 1 typefaces. There are certainly commercial Adobe Type 1 typefaces available in the styles you mention.
b) No. Before you buy *PageStream*, check out the *AmigaTeX* typesetting package, from Industrial Might & Logic on 0273 621393. Ask it to send you the demo disk, I think you'll find it suits your needs better.
c) No. And there probably never will be. To write and distribute such a product you'd need a license from AGFA, which would cost a pretty penny or two. ***JW***

CLOCKING AROUND

I recently replaced my 68000 chip with a 10MHz 68010 chip. Is there any way of running this chip at the full 10MHz by disconnecting the 7MHz clock and connecting a 10MHz clock instead? If I did this, my guess is that it would need to be synchronised with the rest of the system, or would it work as it is?

Alternatively, I could divide the 28.6Mhz master clock by three using a ripple counter, I would end up with a 9.5Mhz clock signal. Would this work if I connected it to the 68010?

I have a degree in electronics engineering and therefore I am quite capable of performing hardware surgery, but I don't know the inner workings of the Amiga.

Finally, I have a suggestion. How about having a monthly publication for the hardware and electronic freaks, like myself, detailing electronic projects to build for the Amiga, eg: memory expansions, amplifiers, ROM switchers and so on. Also, an article about the inner workings of the Amiga would interest plenty of people who would like to know how the Amiga works.

Mehmet Dinch
Ilford
Essex

I am afraid that it is not as easy as you suggest to do this sort of upgrade. When the 68000 accesses various parts of the system bus it expects to do so at 7.14MHz. The 28MHz master clock signal is there for the video dot clock, and without extensive bus contention logic, running the system clock at anything other than a direct multiple of 7.14MHz is nigh on impossible. 14.28MHz is the easiest to do, and a number of PD hardware expansion documents are on the BBS networks describing how do do this operation, although it is known to have some unfortunate side effects with some hard disks. It involves a 74LS74 to halve the 28Mhz clock rate. In general, this sort of hardware project should be discouraged, as you can damage your Amiga quite extensively – in the long run it's a lot less hassle to buy a proper accelerator – at least then you have someone to moan at if it does not work correctly.

An article on the inner workings of the Amiga is a good idea, and you can expect to see something along these lines in the near future. ***TS***

SCREEN SHOWS RED

I recently purchased a Kickstart 1.3 ROM to upgrade my 1.2 in anticipation of purchasing a hard disk. After installation, the screen flickers for a while and settles down to solid red. Replacing the 1.2 ROM restores the machine to normal operation. The machine is otherwise healthy, as is the 1.3 Kickstart ROM (tested thoroughly in a friend's machine). Phoenix of Leeds has been very helpful, although it was unable to solve the problem, however may I congratulate it on its excellent service?

R Pontefract
Keighley
W Yorks

Well, I'm baffled by this. I've never had any problems fitting a 1.3 ROM to any Amiga, including really early models. All I can suggest is that you have some obscure hardware fault which you should get one of the more reputable repair companies to look at. ***JR***

DISKCOPY PROBLEM

My computer has developed the following diskcopy problem: when using the CLI or Shell to duplicate disks in DF0:, the computer will read and write the first part (the first 40 tracks) then after I have inserted the source disk again and pressed return, the computer will abandon the diskcopy process with the following message...

```
Ver'ing 0,79 to go
Error On Destination Disk
Verify Error, Diskcopy ↲
Abandoned
```

I have checked my disks using a variety of different boot and file virus checkers including John Veldthuis' *Virus Checker 5.26*. These did not expose any viruses. I have even tried using the CLI and Shell from my original Workbench disk which, as far as I know, has never been write enabled.

All of the other CLI or Shell commands that I use from the Workbench appear to be working normally. Is there a fault with my disk drive or computer? Or is it possible that I have missed a virus somewhere?

Steve Jordan
South Molton
North Devon

If you've checked all your disks using a variety of different virus checkers, then I'm quite sure that you don't have a virus. John Veldthuis' *Virus Checker* is one of the most dependable virus checker programs available (I use it myself), so I'm quite sure that it would have detected a virus if one were present. What I can't quite understand is why the Diskcopy operation reads and writes the first half of the disk but falls over when trying to read the second half. If it were a head

TAKE IT AT FACE VALUE

I recently bought a bog-standard Amiga 500 Plus and was looking to buy a printer. I have seen adverts for a Commodore MPS-1270 inkjet printer in the price range of £120-£130 and was wondering your views? Is it value for money, considering the fact that it is almost half the price of any bubble jet printer I have seen?

Brian Molloy
Peterborough

The MPS-1270 is basically the equivalent of a 9-pin impact dot-matrix printer, but it uses jets of ink to print with instead of striking pins against a ribbon.

Because it is 9-pin (or 9-jet if you like), its highest resolution is nowhere near that of the 48-pin bubble jets or the Hewlett-Packard DeskJet. And there are printer driver problems. The EpsonX[CBM_MPS-1250] driver will work with the MPS-1270, but not completely properly. There isn't a proper Amiga printer driver for the MPS-1270.

If you want high quality results, I'd recommend one of the portable bubble jets like the Canon BJ-10ex, Star SJ-48 or Brother HJ-100, all of which have proper Amiga printer drivers for them. ***JW***

alignment problem, the diskcopy command wouldn't even be able to read the first half and you'd find that your machine produces read/write errors continuously.

Whatever is going wrong, I think that you've definitely got a hardware problem there somewhere, so take your machine along to a Commodore approved service centre and it should be able to sort it out for you. Sorry I couldn't be of more help. ***JH***

2ND HAND MONITOR BLUES (PART 3)

I have a second-hand Panasonic FST TV (TX-2450), which has a huge screen, and I would like to use it instead of my old Philips 14" monitor. The TV has a SCART input, but it won't work with my old Philips SCART lead. I have no information on the Panasonic, nor a phone number for the company, so I don't know whether the TV can take an RGB input or if I just need a different lead. I know I can just use the modulator but then the quality isn't particularly good. Can you help?

Elliott Abbey
Barnet
Herts

Apparently there is a small problem with some newer TV/monitors where on-screen status displays and other switching functions are carried out by a single chip which is controlled by an external voltage being applied through pin 8 on the SCART socket. Instead of having the standard 0.5V low, 3V high switch, certain sets simply blank off the screen when more than 0.5V is applied. The fix I was told is to put a 150 Ohm resistor in series with the voltage line to SCART pin 8.

Panasonic can be contacted on 0344 862444. ***GW***

ESCAPE FROM SCRIBBLE! – THE SEQUEL

Your reply in the January 1992 issue to a printer question, entitled 'Escape from Scribble!', sounded just what I needed on my invoices. I followed the steps one by one, and now I can turn on expanded print, but I can't turn it off. What am I doing wrong?

Second, I cannot get my NEC Pinwriter to print vertically. Workbench is set up, but no go. Consequently spreadsheets are extremely small, having to fit across an A4 sheet and not along it.

Third, your articles last year on bulletin boards were very interesting but a cautionary word to your readers. I bought a modem, spent a while setting it up, and called several boards. I took some files from one, put them on to another, and so on, to gain credits to get more files. The games were addictive, and I 'talked' to many interesting people.

Result: a phone bill for £889, a sold modem, a bank loan, and a gleeful BT.

Please tell your readers that it is very easy to run up a massive bill. It's no use saying "just one more file" because even though charges are low in the evening, a good file takes a while to download, even if the phone lines are good. You could easily end up paying more for PD than if you bought it from a dealer.

Discipline is the only answer, I found that limiting myself to one hour every second day cut the bill. The next one was only £320.

Anthony Mercer
St Annes
Lancs

The secret to cheaper comms, Anthony, is indeed discipline – find and stick to one or two local bulletin boards, and call them between 6pm and 8am, and at weekends, which works out to about 60p per hour. If you go gallivanting all over the country, even at cheap rate, it will, as you have found out, cost a fortune.

The first phone bill after you first get a modem is always the highest, after that the novelty wears off and you learn to download only those files you want, rather than everything in sight. I call a bulletin board almost every night to pick up messages, and my total quarterly bill is rarely more than £100, of which £50-£60 is comms.

Now, to your problems. The Vertical/Horizontal option in Workbench Preferences you are playing with is purely for graphics dumps. If you want to print spreadsheets sideways, you'll need special software that, to start with, completely redefines the font in the printer. This sort of thing takes ages, and the results are not usually worth it. In fact I don't know of an Amiga spreadsheet that'll do it. The real solution is to buy a wide-carriage printer, or do as you are doing – print it in condensed text.

To turn off expanded text in *Scribble!* you need to send the ESC[5w sequence. Look in Appendix D-4 of your Amiga manual for a list of all the ANSI printer style commands. ***JW***

GAMES ON THE MACHINE

Would you please give me your views on the following:

I have a B2000. I use business software, but I also like playing games as most people do. When the B2000 is replaced I would be interested in buying the new model, however, the new machine is likely to be 32-bit, ie, 68020/'030 or '040.

What happens to people who wish to upgrade, buy the new machine but still run all of their games? Would they have to stop playing games or have a 16-bit and a 32-bit Amiga.

Mr Robert Hart
Roehampton
London

This is a tough one to answer. Commodore has said that it is committed to the continued development of the Amiga platform, and rumours have told us that new machines will indeed be 32-bit and have enhanced hardware of some sort. As to what the specifications of these rumoured machines are, your guess is as good as mine, and I am certainly not able to comment on this subject.

However, the second part to your letter is much easier. Older, badly written software is likely to break on the new machines. This is because they are breaking Commodore's set down development rules. More modern games software is unlikely to fail. This is the problem that A3000 owners faced when they bought their machines – suddenly for the first time there were Amigas without a 68000 chip inside and instead fitted with a high powered 68030 chip at 25MHz with a 68882 FPU. This caused lots of games to go wrong, as they had incorrectly assumed the user would have a 7.14MHz 68000 inside their computer.

With the continued rise in popularity of accelerator cards, software houses, especially games producers, have had to ensure that their software will run, or face a seriously reduced market.

With this in mind, should new Amigas appear in the near future it is highly probable that the vast majority of mainstream games software will run. ***TS***

UNWHOLESOME CHARACTERS

I have a Panasonic KX-P1081 printer using EpsonXold, EpsonX and EpsonQ drivers. With my first printer lead the printer consistently printed characters 32 less than displayed on screen, so "S" became "3" etc. I decided the lead was faulty and bought lead number 2 from a different manufacturer. This does the same thing, but this time drive DF1 will not read a disk while the lead is connected. The printer works perfectly with my Amstrad CPC and Dragon 32. It is connected directly to the computer and not via any form of switching.

David Thomas
Newark
Notts

It looks like one or both of the CIA (8520) chips in your Amiga are blown. You can replace them yourself fairly easily (they cost around £15 each) – but if you're not keen on doing that I'd suggest you send it to one of the repair companies. ***JR***

FIXING THE FLICKER

a) Having recently bought Gold Disk's *Professional Page 3*, is it possible to run *ProPage* without the flicker?

b) My new hard drive (a GVP Impact Series 2) instruction book doesn't go into much detail on how to copy programs and files from disk on to the hard drive. How is this best done? I have not succeeded in installing *Personal Finance Manager* (PFM) even after clicking on the 'ToHD' hard drive installation

MONITOR WARNING!

Since the buying of second-hand monitors (and other equipment) appears to be on the increase I would advise anyone thinking of picking up a "bargain" at an auction or second-hand shop to be extremely cautious, especially when contemplating buying something which is either quite old or not particularly mainstream – especially if it has no manual! You may find to your cost that not all monitors are created equal and you are saddled with a piece of worthless junk. You have been warned! *GW*

program. Can you recommend any good books that will make life with a hard drive more bearable?

Keith Richards
Exeter
Devon

a) There are basically two ways you can rid your *ProPage* screen of interlace flicker. The first is to click on the 'Interlace' option in the pull-down menus. This will switch *ProPage* to medium resolution. This can be made pernament by adjusting *ProPage*'s icon tool types. Simply click once on the *ProPage* icon and then select either 'Info' (for Workbench 1.3) or 'Information' (for Workbench 2.0) from the Workbench pull-down menus. Find the 'INTERLACE' tool type and change it to read 'OFF' (the default is 'ON'). Save this new setting and *ProPage* will always boot up in medium resolution.

The second and best, if rather expensive, option is to treat yourself to an ICD 'Flicker Free' video card for your A500 and a multisync monitor. This will give you a rock steady display in high resolution but will set you back around £500. If you can justify this sort of outlay, then it'll make *ProPage* far more usable.

b) I find directory utilities such as INOVAtronics' *Directory Opus* very useful for this sort of thing, although PD versions (such as *SID*) will do the same job but for considerably less cash. Directory utilities allow you to travel around the directory structure of a disk, copying and deleting files without having to get your hands dirty with AmigaDOS. ***JH***

MONITOR CHOICE



I am considering buying a monitor for my A500 Plus and have narrowed the choice down to either the Philips CM8833 MkII or the Protar stereo monitor. The decision rests on the following criteria:

a) How superior is monitor display when compared to a television?

b) Do the monitors have horizontal and vertical width control?

c) Do they suffer with discolouration when large areas of colour (particularly white) are present. I'm fed up with this problem on my TV.

d) Are the two monitors really stereo (ie they have two speakers) or do they just provide stereo through a headphone jack?

e) Which do you recommend? The Protar is supposedly identical to the Philips unit. Is this true?

David Lambert
Garrowhill
Glasgow

a) Monitor display should normally be vastly better than TV.

b) Yes.

c) If they do, they can only be faulty.

d) Really stereo.

e) This question is now just academic, since the Protar monitor has been discontinued. It was, however, simply a rehoused and rebadged 8833. ***GW***

FASTER DTP PRINT-OUTS



I used to own an Amiga 500 but recently part-exchanged it for an Amiga 2000. With that I purchased a GVP internal hard drive and *PageStream 2.2*. I also own a Hewlett-Packard Deskjet 500C, and bought *PageStream* not only as a DTP program but also to drive the printer in its full resolution, since I have not found a driver to do this.

I tried the WeServe driver, which *Amiga Format* recommended, but it only worked at a resolution of 75 dots per inch.

***PageStream* runs the printer but it takes more than 20 minutes to print out a full colour page. Would an accelerator speed this up, and if so, which is the best value for money? Also, *PageStream* prints out the picture very darkly. I can find no way to alter that. Is it possible to alter this, and if not, do you know of any printer drivers which will drive the printer in its full resolution?**

J Crabtree
Read
Lancs

An accelerator certainly would speed-up print-outs – with a 68030 your 20 minutes should come down to five minutes or less. But even a 68020 accelerator will dramatically increase the speed of your machine, and one of the best bargains at the moment – under £400 – is the Commodore 2620 card for the Amiga 1500/2000. Speak to Almathera Systems on ☎ 081-683 6418.

To get clearer print-outs from your Deskjet 500C you need *TurboPrint Professional 2*, which allows you to alter the 'colour correction' so that colours on paper print nearer to those on screen. Alas, *Turboprint Professional* and *PageStream* don't work together very well, so this combination will not enhance your desktop publishing, although it works wonderfully with paint programs and word processors. ***JW***

NO MORE DISK SWAPPING



I am considering purchasing a Supra RAM expansion with 4Mb on board, thus giving a total of 5Mb of RAM (my A500 already has a Zydec 512K trapdoor expansion). What I want to know is whether it is possible to load two or possibly even three disk games completely into RAM, therefore eliminating the hassle of having to swap disks continuously. My buying decision hinges on your answer to this question, so I would be grateful for your help.

Alan Lamberton
Barrhead
Glasgow

Unless the game comes with some form of hard disk installation software (you can treat the RAM disk as a hard drive for this sort of thing), it is impossible to transfer the contents of multidisk games to RAM and expect them to work, mainly due to the copy protection that software houses use. Some games are specifically written to take advantage of extra RAM (*Interceptor* is a good example of this), although this rarely cuts down on disk swapping – all you usually get are enhanced sound effects and graphics. ***JH***

JARGON BUSTING • JARGON BUSTING

GIF – Graphics Interface Format is a file format used for storing pictures so that they can be transferred between different computers and, particularly, so that they can be transmitted across computer networks.

Interlace – A method used to double the apparent vertical resolution of the monitor by alternately refreshing the screen at a vertical offset, squeezing an extra line between each of the lines of a normal screen.

RAM disk – An area of memory that is treated as if it were a floppy disk. The advantage is that files can be stored and retrieved much more quickly, though all information is lost when the power is switched off.

RGB – Red Green Blue is a standard for video signals that provides better quality than composite or Radio Frequency signals.

MINISCRIVE DRIVE



Please could you tell me whether it is possible to fit a Miniscribe 3650 hard disk to my A2000?

a) If a card for it is obtainable, where can I get one?

b) Will it work with an IBM ST506 controller fitted to my Amiga – if so, where can I get the drivers and low level formatter for it?

Andrew Clark
Bishops Stortford

The only card that you can use to control the Miniscribe drive in your Amiga 2000 is the (now obsolete and no longer produced) Amiga 2090A controller from Commodore. It's really horrible to set up and you'll find the drive unreliable and slow. Drop it out your window. ***JR***

PICTURE EXCHANGE



I have an Amiga which I use for digitising pictures with *Digi View 4 Gold*. My problem is that I swap digitised pictures with my friend who has a PC. I use *MessySid* to place my pictures on his PC formatted disks, in IFF format, which he then converts to GIF. Is there a program I can use on the Amiga to convert GIF to IFF?

DA Lawton
Redcar

There are several commercial programs, including ASDG's *Art Department*, Black Belt's *Imagemaster* and also *Rasterlink*, which all include GIF-IFF conversion among their functions, but as well as being expensive it would be like cracking a nut with a sledghammer.

PD-wise, there's a program called *WASP123* (or a variant of this) which is a CLI driven utility that can convert several variations of GIF to assorted IFF formats, and it works just fine. But with only 2Mb of memory on your Amiga you might still find the going tough, especially with larger files. ***GW***

Control your DESTINY

...and pictures, animations, wipes, sound, text, music and interactive presentations and a whole lot more with Director 2. Plus: Gary Whiteley's guide to chroma keying with RocKey

To tell you the truth, *The Director* version 2 isn't a new product. In fact, as software goes it's quite an old dog (I don't mean that unkindly). But *Director 2* is unique, for, as well as having many tricks that remain unsurpassed, it also offers the user a high return for his investment – in terms of cost and effort. The reason I'm giving it space is that I don't recall reading much about it and I think that's a shame. If you need precise control over your audio-visual productions, animations and interactive presentations and you can't get it with your current programs, try *Director 2* – you'll like it.



My geological master map, part of the example script, produced with *DPaint III*. Click in a selection box and the result pops on to screen...



And if OIL was chosen this is what you would see. Clicking on various oilfields will produce further textual information by activating irregular shaped buttons

Like its predecessor, *The Director*, you are required to produce written scripts using *Director*'s own easy-to-follow language.

These scripts look much like Basic programs and all the elements of Basic programming are incorporated. But *Director 2* is much easier to use than its forerunner because of several new utility programs, which take the drudgery out of more complicated processes.

Although scripting may not be everyone's idea of a simple user interface there is no doubt that it increases *Director 2*'s flexibility enormously, letting the user define what happens, how it happens and when – in a style which suits him.

SCRIPTING

Director 2 has a built-in text editor called DEdit which is used for writing scripts. Although any text editor can be used, the advantage of DEdit is that calls to other *Director* programs, such as the Blit and Button Utilities or Director Libraries can be made, as well as directly running the current script.

Scripts can be as simple or complex as the user requires. A simple slide show may consist of nothing more than commands to load and display a series of pictures from disk, whereas an interactive presentation with hot keys, mouse control, animation, picture blitting, sound, text and multiple backgrounds could be 100 lines plus in length.

With such a wide range of options it's well worth sketching out a battle plan on paper before hitting DEdit. Forward planning, flow-charts and modular scripting will assist in clarifying your work, helping you achieve results faster, reduce redundant or duplicate code and ease debugging chores.

Once scripting commences, it's likely that you'll occasionally need help from the manual to get the best out of the *Director 2*'s features. I found it well written and helpful and even a novice should be able to learn quickly. It has an abundance of example scripts and code fragments and covers all the features of *Director 2* in great detail. Supplementing the manual are



The chooser screen of an animation player. The chosen animation will load from hard disk and loop until returned to the chooser. I also built in a keyboard-driven speed control

around 40 fully-working examples and utilities which can be examined, adapted and incorporated into the users' own scripts.

To ease the chore of scripting, Right Answers has thoughtfully supplied several utilities to take the strain out of making on-screen

continued on page 73

FEATURES & USES

***Director 2* can handle:**

- IFF pictures and animations, including chaining anims together
- Text files and fonts, with embedded formatting
- Drawing functions
- Picture blitting, sprites and animbrushes
- Polygon morphing and brush path design
- ARexx
- Mathematical Functions (including sine & cosine)
- IFF sound samples, SMUS music files and MIDI
- Picture to picture transitions – including custom wipes
- Keyboard and/or mouse operations
- On-Screen buttons – including colour and irregular shapes
- Palette manipulation
- Strings and arrays

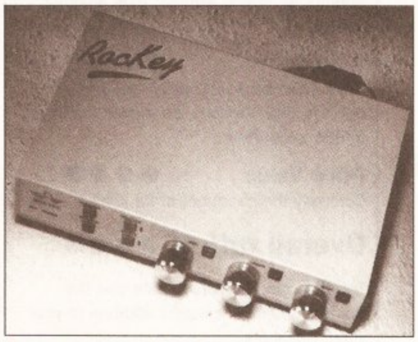
Here are a few things that *Director 2* can be used for:

- Compile animations through scripts
- Make interactive presentations with control via mouse and/or keyboard
- Build archiving systems for pictures, animations or sounds with speed and volume controls
- Synchronise samples and music to animations and slide shows
- Use custom wipes for transitions between pictures
- Data presentation
- Writing customised software for many applications, including games, educational aids, point-of-sale displays, information screens etc
- Setting paths for brushes to follow on screen
- Automated drawing routines

SINGIN' THE BLUES *with RocKey*

1 Take one (tall and ugly) presenter and put him in front of a blue background...
2 Next load the graphics that you prepared earlier...
3 Mix the two together using the Rockey and serve up to video tape while still hot

Everyone knows how to put Amiga graphics over video – you use a genlock, right? But how do you reverse the effect and put video in front of an Amiga graphics? By using a keyer, or even better by using a chroma keyer, like the new RocKey from RocTec.



Easy to connect and easy to use, it's the RocKey chroma keyer

Before you start screaming that £299 is a lot of money, consider that until the advent of the RocKey there hadn't been such a low-cost chroma key unit for the Amiga/video user – and especially one aimed at the lower end of the market.

But even at this price there's a catch – the only thing that the RocKey can do on its own is work as a colour splitter for video digitising. To perform the rest of its tricks it needs a partner – a genlock. So keeping it totally RocTec, and since they were obviously styled and designed to work together, I hooked a RocGen Plus up to the RocKey for my tests.

By running the two units together a whole range of keying and genlocking effects can be generated – from pure chroma keying and normal genlocking to some special combinations such as Graphics Window, Key Sandwich and Key Thru, which I'll cover later in the article.

GETTING STARTED

Hooking up the equipment is easy enough and the instructions provided are very clear and helpful, though the example illustrations are rather vague. One point though – do make sure that you use proper 75 Ohm video cable for your connections, as audio-type cable will almost certainly cause quality problems.

Any composite video source is suitable for use with the RocKey, so cameras, VTRs, laser disks and still video cameras (such as the Canon Ion) would all be OK. Although the RocKey requires external power a nice feature is that it will automatically switch on or off according to whether or not the host Amiga is powered up, which should please users with weak Amiga power supplies.

COLOUR SPLITTING

The operation of the RocKey is based on colour splitting techniques to first separate and then mix the RGB components of the video image with Amiga graphics, via a genlock. By controlling the amount of each colour component and the mixing mode, a variety of special effects become possible. A direct benefit of using colour splitting is that owners of monochrome digitisers can make use of the RocKey's splitter output to grab colour images from a suitable video source.

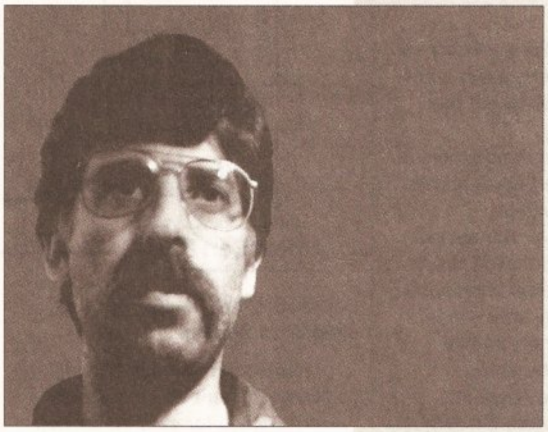
ROCKEY IN USE

The RocKey is controlled through a combination of switches and fader knobs on the front of the unit, and with nine basic permutations there is plenty of scope for experimentation.

> *"The RocKey can be used to chroma key practically any colour"*

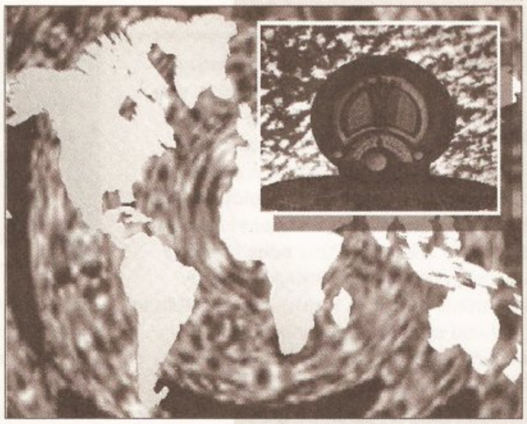
For instance, a basic chroma key requires both the Chroma and Blue buttons to be selected, with fine tuning being made with the red and green controls once the blue level has been determined. Surprisingly though, you are almost left to figure out that the red and green controls can also be used for setting the main key colour, instead of blue, and in fact combinations of colours are

1



possible. This means that the RocKey can be used to chroma key practically any colour, not just blues. In fact there is a table of switch settings in the back of the manual but it isn't really obvious why it's there. Although the RocKey's main function is obviously its chroma keying, this doesn't mean that its other operations are just afterthoughts. Far from it. Under the right circumstances Luma keying, which replaces areas of selected brightness within the video, can be as effective as the more complex Chroma keying method. For more on these two methods of keying, turn to the boxout on page 72.

2



Novel effects are possible by defining which colour is to be the key colour (either in the video or graphics, depending on requirements) and in what order the keying takes place. So it can be possible to define a selected video colour to

3



become a 'keyhole' through which Amiga graphics appear (Key Window), or produce an effect where some portions of the Amiga graphics will be in front of the video image, while others will be behind.

One of the effects which can be produced, the Key Sandwich, is demonstrated to particularly good effect in the RocKey video by keying live video of a person over an animated logo which spins around both in front and behind his head, while he follows the logo with his eyes.

THE KIT

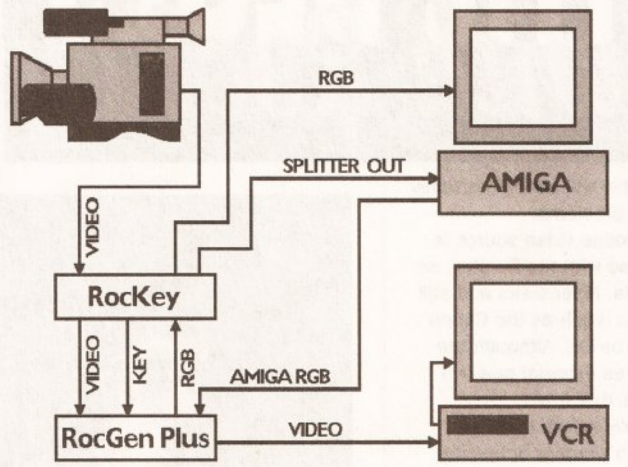
In addition to the genlock mentioned previously in this article, a few other things are also needed to get the best from the RocKey.

Probably the main requirement is a space where a blue backdrop can be set up, large enough to accommodate whatever the subject is you wish to key. You could use a blue cloth for a backdrop unless you want a permanent key area – in which case it may be worthwhile taking time to paint the area.

Next you will need adequate lighting to both illuminate the subject and flatten out shadows on the backdrop. A video camera and monitor will also be indispensable, plus a VCR to save the final key mixes to video tape.

PROBLEMS

I found it impossible to get a full overscan screen, but I think this may have been the fault of the RocGen I had, so don't worry too much about this if you are contemplating buying a RocKey.



Connecting the RocKey isn't as difficult as it looks

Remember that when using any video equipment which requires external video for synchronisation (such as genlocks and keyers), the results are dependent upon the quality of that signal. Give 'em junk and that's what you'll get back. When keying off tape there was a degree of fringing around the key subjects which could be minimised but never completely removed. The output from a video camera was definitely superior.

THE DOCUMENTATION

There's a slim manual provided which is certainly instructive, but far more useful is the video tape which RocTec, in common with several other manufacturers, have bundled with the RocKey. As well as explaining the effects the RocKey can produce, and how to hook together and use the whole system, it demonstrates what an awful taste in background music some people have. And being an American production it also turns out to be quite a good demo of the Video Toaster as a production tool, for those who may be curious.

SHOPPING LIST

RocKey.................................. £299
by RocTec Electronics
Available from:
HB Marketing Ltd, Unit 3,
Poyle 14, Newlands Drive,
Colnbrook, Berks
SL3 0DX
☎ 0753 686000

CHECKOUT RocKey

Documentation ●●●●○
Simple but thorough, and when used in tandem with the demo tape you should be off to a brisk start.

Features ●●●●○
RocKey has a wide range of controllable options for keying effects, plus a colour splitter.

Quality ●●●○○
Keying can be a little noisy and fringed, but it is VHS-oriented, so maybe I'm being a little tough here.

Price Value ●●●●○
Currently the cheapest of its kind.

Overall rating ●●●●○
For all-round VHS/composite use the RocKey could be a useful addition to your video hardware.

THE KEY TO KEYING

Keying is a common effect nowadays – you'll see it on TV, commercials, pop videos, on the news and on weather forecasts. Keying is used to place people in front of exotic imagery, as a special effect, or when adding graphics to a picture. It's a technique used universally by broadcasters and home enthusiasts alike. But how does it work?

The simplest definition of keying is that by using an electronic device (a Keyer) it is possible to replace a defined portion of one image with an entirely new one. Like a plain studio background being replaced with a picture of the Kremlin, for instance. But surely this is what a genlock does? Not quite. It's true that graphics can be overlaid on video by using a genlock – which is performing a keying effect – but a genlock cannot insert a video image in front of graphics, which is where a video keyer like the RocKey comes into its own.

There are two types of keying – known as Luma and Chroma (Luminance and Chrominance).

LUMA KEYING

Luma Keying is based on the brightness of an image, the Luminance Signal being that which determines the brightness (or tone) at each point in a video picture. By selecting a brightness level to use as a key setting it is possible to produce a key pattern which can be any single brightness from white at one extreme to black at the other. A simple Luma key might be a false window in a studio set which is 'glazed' with white panels. If the luma keyer is set to white then a 'hole' will be produced in the video image where the white panels are which can then be filled with another picture, such as an exterior. Although relatively simple and cheap to produce, the disadvantage of Luma keying is that it is not fussy about which portion of a picture is dealt with so long as it is at the selected brightness. So in my example a performer in a dark suit and white shirt in front of the window would also have the exterior image showing through his shirt, which is going to look rather odd if the production is a period drama rather than science fiction. Even though careful lighting can improve the scope of Luma keying, it will always exhibit this problem.

CHROMA KEYING

However, by employing Chroma Keying it is possible to target a specific colour in a scene, rather than a brightness. This increases the flexibility of the keyer since it can be fine tuned to a specific hue, which could in fact be any single colour, though the most often used is a bright royal blue which is usually called Chroma Blue in the trade. The reason that blue is chosen is that it is one of the few colours which isn't a component of the colour of human skin, meaning that a presenter's face or hands will key cleanly. Of course there could be problems with blue eyed people, and clothes must be carefully chosen, but Chroma keying can produce more selective results than luma keying.

Scenes destined for either variation of keying should be both well and evenly illuminated, with as few shadows as possible. If a scene is to be done as a long shot it may well be impossible to provide a large enough background to fill the frame – in which case a suitably coloured mask may be attached to the camera in order to cut out undesired objects such as lighting rigs.

CAMERA VERSUS TAPE

It is better to Chroma key directly off camera wherever possible because this will provide the cleanest (least processed) signal and hence suffer less visible degradation problems, fuzzy edges and breakup. In fact, optimum quality would be achieved by feeding an RGB video signal from camera or tape directly into a compatible keyer, cutting out the coding and subsequent decoding to and from RGB to composite or component video. But such RGB outputs are uncommon, especially in the domestic/VHS oriented environments the RocKey is aimed at. Using a camera or VTR composite output obviously keeps the costs down, but the quality tends to be compromised.

DIRECTOR 2 – EXAMPLE PROGRAM

This program incorporates a pre-defined set of buttons which were set up using *Director 2*'s Button Utility. These are used to enable a mouse click to cause a subroutine to be activated, such as showing additional information when a menu box is selected. When a material is chosen from the Key a new map will appear and further information will become available. This script is intended only as an example and while it is fully tested and working it is not completely finished.

```
REM  INTERACTIVE PRESENTATION OF BRITISH GEOLOGICAL FEATURES
REM                              by Gary Whiteley
INCLUDE "UKbuttons" :REM utilise pre-made Buttons file - these ↵
include Coal, Oil, Gas, CoalText, Northumbrian, MoreInfo and ExitInfo.
MODULE "DH2:Director2/Director/modules/sound" :REM load sound module
DIM textdata[1000]   :REM dimension textdata$ array
ABORT 2              :REM Set program exit to be on any keypress only
SOUND "LOAD",1,"DH2:director2/tutorial/sounds/mousenoise": ↵
REM sound sample
LOAD 1, "DH2:Director2/UKmastermap" :REM Load main image
COPY 1,3             :REM Copy Main Map to buffer 3 for blitting
DISPLAY              :REM display UK mastermap
DRAWMODE 0           :REM Draw only with foreground pen
MARGINS 500,630 :REM define margins for text
LOADFONT 1,18,"Times.font" :REM Use Times font, size 18, from font dir
PEN 0,3              :REM set background pen to palette colour 3 (blue)
PEN 1,1              :REM set foreground pen to palette colour 1 (white)
/top:
    GETMOUSE x,y         :REM check for mouse key press & return co-ords
    DO Playsound         :REM Play sample on mouse key press
    DO UKButtons,x,y,1 :REM Use co-ords to activate selected button
    GOTO top                  :REM if nothing happens keep looping
/Coal: REM Load COAL image when COAL button in Key is selected
    X=1                       :REM set a flag for later
    LOAD "DH2:Director2/UKCoal" :REM load new image
    DISPLAY                   :REM display new image
    GOTO top         :REM go back to /top: and wait for next mouse press
/Oil: REM Load OIL image
    X=2
    LOAD "DH2:Director2/UKOil"
    DISPLAY
    GOTO top
/Gas: REM Load GAS image
    X=3
    LOAD "DH2:Director2/UKGas"
    DISPLAY
    GOTO top
/MoreInfo: REM Place additional information when button is selected
    IF X=1 THEN DO Coaltext :REM Activate Coaltext subroutine
    IF X=2 THEN DO Oiltext
    IF X=3 THEN DO Gastext
    GOTO top
/ExitInfo: REM Restore menu when info box is exited
    BLIT 3,494,76,494,76,136,428 :REM Blit menu area back on screen
    GOTO top
/Playsound: REM Play sample when mouse key is pressed
    SOUND "PLAY",1
    RETURN
/Coaltext: REM Displays general text if MoreInfo is selected.
textdata$="|p01COAL USE |r2 Since 1990 the use of coal in the UK has ↵
halved, and many British collieries have been closed down." ↵
:REM This is made up text with embedded formatting codes.
    DO TextBox :REM Use TextBox subroutine to save coding
    GOTO top
/Northumbrian: REM Displays text if Northumbrian coalfield is ↵
selected.
textdata$="|p01The Northum- brian coalfield is the largest subsea ↵
coalfield in the UK." :REM Text with embedded single letter spacing
    DO TextBox
    GOTO top
/Oiltext: REM Not finished yet
    MOVE 500,100: textdata$="OIL USE"
    DO TextBox
    GOTO top
/Gastext: REM Not finished yet
    MOVE 500,100: textdata$="GAS USE"
    DO TextBox
    GOTO top
/TextBox:
    PEN 1,3                  :REM Current colour blue
    RECT 494,76,630,504 :REM Blank out selector
    SETFONT 1                :REM Use Times font
    PEN 1,1                  :REM Current colour white
    MOVE 500,100             :REM Move cursor to 500x, 100y
    FTEXT 0,textdata$    :REM Write relevant text from cursor position
    RETURN :REM Continue right after last issued DO TextBox command
REM Program exits when any keyboard key is pressed
```

JARGON BUSTING • JARGON BUSTING • JARGON BUSTING

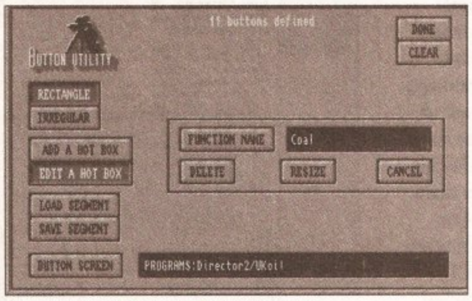
Blitting – Partial screen flipping by transferring a rectangular area of a picture held in a hidden buffer to the picture currently being displayed. Improves display speed by reducing data overheads.

Buffer – A portion of memory temporarily designated for data storage.

Double Buffering – Used to prepare the next image in a hidden buffer while the current one is being displayed. A quick flip to the hidden buffer is all that's needed to keep the animation smooth and sleek.

continued from page 70

buttons or setting up blit routines, as well as other functions. Now, the Blit utility can be used to define the areas to be blitted and then export a complete blit command to the script



4-colour med res. This innocuous looking screen is the key to making easy buttons with *Director 2*

– a great time and effort saver. Likewise, buttons can be determined and incorporated into a script, as in the example on the left. Libraries for wipes, anim construction and sound playback can also be coerced into the script just as easily.

By scripting in a modular fashion it's easy to make tests at various stages to ensure that all is going smoothly. When the script is run it is compiled into a .FILM file which is played back using the *Director*'s own freely distributable Projector program, so that self-running disks can also be made of the completed work. If for some reason your script won't run, *Director* will return you to the editor and the offending script line will be indicated so that debugging becomes easier.

To be on the safe side I tested *Director 2* with a genlock and I had no problems – locking was clean and stable. I did have one system problem when using the DOS 2.04 startup-sequence: *Director 2* didn't want to know, even though it is supposed to be v2 compatible. However, the trouble went away some time later so I assume that something in my system was causing the trouble, not *Director 2*.

SUMMING UP

While *Director 2* doesn't offer the ease of use of programs with neat graphic interfaces such as *Scala*, *Hyperbook* or *AmigaVision*, which are probably its nearest 'competitors', it does have a scope which eclipses both *Hyperbook* and *AmigaVision* for flexibility. Against *Scala 1.1 Director 2* pales on many points, especially wipes, text handling and ease of use, but it still holds its own where many of its unique functions are concerned – sound, maths, array and string handling, palette manipulation, irregular buttons, blit control, and so on. And it is cheaper.

Some of the other features I liked include the Polygon utility's simple method of making paths to move objects along; the Convert-Anim wipe generator, which takes a two colour animation and produces a custom wipe pattern; the mouse and keyboard control; and the embedded text formatting functions.

NEXT MONTH

I'll be taking a look at Centaur/Opal Tech's *OpalVision*, a true colour graphics board that, once expanded, promises to deliver Video Toaster-like features for PAL users.

Gary Whiteley can be e-mailed as drgaz@CIX.compulink.co.uk

SHOPPING LIST

The Director Version 2........ £99.99
by Right Answers Inc
Available from:
Alternative Image,
6 Lothair Road,
Leicester, LE2 7QB
☎ (0533) 440041

CHECKOUT THE DIRECTOR 2

Documentation ●●●●●
Very thorough, with plenty of specimen programs, tutorials and working examples on disk to refer to and modify.

Features ●●●●○
More than any other presentation program.

Usability ●●●○○
Programming might put off the script-shy, but that would be a shame.

Price Value ●●●●○
So flexible it has to be good value.

Overall rating ●●●●○

For those hard-to-get-at problems *Director 2* beats the rest. It may not have an elegant interface, but it opens doors other programs don't even have!

Jeff Walker gives his typing fingers a rest and learns to love being lazy with Migraph optical character recognition

BETWEEN THE LINES

Optical character recognition (OCR) is one of computing's success stories. While the boffins continue to say "real soon now" about things like virtual reality, artificial intelligence and speech recognition, OCR technology has quietly reached such a level of speed and accuracy that it can be used with confidence to transfer all kinds of printed material on to disk.

This success has largely been due to a shift in the way the software recognises characters. Early OCR software employed a method called 'matrix-matching'. After the text had been digitised by scanning, each character was stored in memory as a matrix of dots – a 'raster image' to give it a technical name – very much like an Amiga bitmapped font. But the matrix had to be the same size for every character, so only documents that contained non-proportional typefaces could be recognised. These are typefaces where each letter takes up the same width, like the standard output from a dot-matrix printer or documents produced on typewriters.

The software would try to match a digitised character with every character it had in its database, pixel by pixel, row by row, keeping a count of the discrepancies between it and every character on file. Then it would select the character that had the fewest discrepancies.

MEMORY, TIME & MONEY

It took a lot of memory, and you had to have a character database for every typeface you wanted to digitise. And it took a lot of time. Often it was quicker to type it in yourself – or cheaper to pay someone else to type it in – than buy an OCR package.

And you couldn't OCR text that had been typeset – books, magazine articles and so on – because the text was proportionally spaced.

The invention that revolutionised OCR is called 'feature analysis'. This works by analysing the features of



Using a hand scanner to scan direct into Migraph OCR you can scan sideways (landscape) and have the software rotate the image automatically

characters – how many horizontal, diagonal and vertical lines each has and whether those lines end at the top, bottom, left or right; how many curves and whether those curves are facing left or right, or a closed curve.

The letter 'D' for example could be described as 'one vertical line on the left, one closed curve facing left'. This simple description fits the letter 'D' printed in umpteen typefaces. In fact there's more to a character description than this, but you can see the general idea. Using feature analysis, proportionally spaced and professionally typeset text can be read, as well as text of any size – so pages with headings, subheadings and footnotes can be read in one go.

> **"Headings, subheadings and footnotes can be read in one go"**

Strictly speaking, to work 'faultlessly' the software needs to have a recognition library for each style of type you are going to feed it, but in theory the ability to recognise the difference between the two major type styles, serif and sans-serif, would be enough to be going on with. Even then feature analysis can be fooled by characters that have identical descriptions – the letter 'O' and the number '0' for example. Which is where another bit of jargon comes in: 'context sensitive'.

Say the OCR software comes across a 'one closed curve' description. Is it a letter 'O' or a number '0'? I know, says the context sensitive software, let's look at the character directly to the left. Is it a letter? No. Is it a number? Yes. OK, and what about the character on the right, is that a number too? Yes. Ah, then the odds are that this is a zero because you don't often get the letter 'O' between two numbers.

This technique can become quite sophisticated. For instance, in the English language you never get the letter 'p' following the letter 'q', so if this character sequence is what the OCR software thinks it has seen, the context sensitive part can tell it to think again. So it trundles off and looks in a dictionary. If it still can't make sense of it all, then ultimately it can present the problem to the user and ask him or her to sort it out.



The next step is to draw clip boxes around the three text areas to be OCRed

This part of OCR is called 'training'. You tell the program that the character is really an 'a' – it could have looked like a 'p' because there was a smudge on the paper, or because the 'a' in that typeface is of a weird design. In the latter case you can tell the software to remember the description of that character, and the next time it sees something that matches – assume it is a letter 'a'.

With well-written feature analysis software, a few recognition libraries, a comprehensive context sensitive system, a large dictionary (or 'lexicon' as computerised dictionaries tend to be called), and a good training system that allows 'user dictionaries' to be created, almost any printed document should be transferable from paper on to disk with very few mistakes. Out of 100 characters transferred, at least 98 or 99 should be correct.

At the end of the day, this level of accuracy is the yardstick by which any OCR software must be measured; even an accuracy level of 90 per cent is not enough because it can take longer to find and correct 10 mistakes out of 100 characters than it would a trained typist to type the 100 characters correctly by hand.

MIGRAPH OCR

First, the words that throw fear into every Amiga owner's heart, what are the dreaded 'system requirements'?

You require a hard drive because when Migraph OCR runs out of memory it will use the hard drive to 'cache' data, and the size of the data that needs to be cached can quite feasibly exceed the storage capacity of a floppy disk. The back of the box says a minimum of 2.5Mb is required, but like most memory-intensive programs, the minimum requirement means it'll run, but you won't be able to do very much. If you have just 2.5Mb of memory and you are using Migraph OCR to do the scanning (using a hand scanner, more about this later) then after the program has loaded you will have enough memory left to scan a 4in by 6in area at 300 dots per inch (dpi). The same goes if you are importing pages (ILBMs) that have been pre-scanned – no way can a 300 dpi (or greater) scan of even half an A4 page be imported.

With 3Mb of total memory you can use Migraph OCR and a hand scanner to read in the maximum 4in



The Interactive Learning requester will ask you to clarify any unrecognised characters. Here the small glitch to the left of the 'm' has confused the software, so I replace the '.' in the gadget with an 'm'

by 14in area at either 300 or 400 dpi, and a 300 dpi pre-scanned full A4 page can be imported – just. If you want to handscan landscape (sideways) and have the software rotate the scan by 90 degrees so that it is the right way up again (again, more on this later), further memory will be required (or a hard drive) so that the data can be cached while the rotation takes place.

Migraph OCR feels really wobbly with 2.5Mb, and crashes occasionally. With 3Mb it is more stable, provided you don't try to multi-task too much and stick to 300 dpi scans. Once you get over 4Mb, Migraph OCR never complains of memory shortage, even with a full A4 page at 400 dpi loaded.

Migraph OCR can import black-and-white (two-colour, that is) IFF ILBM files, so it can use scans created with any Amiga scanner, plus two-colour IMG and TIFF files so that pages scanned on another platform can be transported on to Amiga disks and imported if required.

DIRECT SCANNING

The software currently has direct support for three hand-held scanners: Migraph, AlfaData and Golden Image.

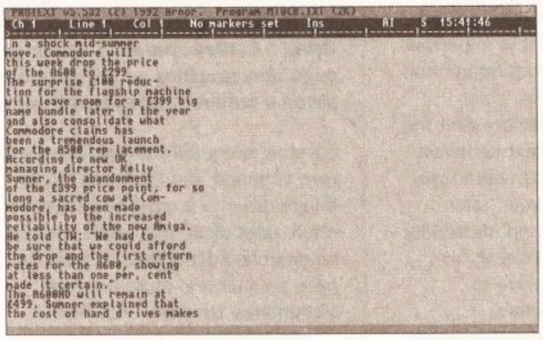
It's the interface part of the scanning equipment that's important here, and the interfaces for these three hand scanners operate in the same way. If you own another make of hand scanner – Power Scanner or DataScan Professional for example – you can still use Migraph OCR but you'll have to use the scanner's specific software to create and save the IFF ILBMs, and then import them into Migraph OCR.

(Or you could try 16/32 Systems on 0634 710788 which sells the Golden Image interface separately, which allows you to use the direct hand scanning part of Migraph OCR).

The direct scanning part of Migraph OCR is a doddle. The Scan Settings requester has just three features, and one of those – the scan resolution – is automatically read from the switch on the scanning head. A slider allows you to specify the length of the scan in inches or centimetres. This slider is intelligent inasmuch as its maximum length will never be greater than memory will allow; 14in is the absolute maximum. The width is always 4in – the width of the scanning head of course.

The third option is Portrait or Landscape. Portrait is for scanning columns of text that are 4in or narrower. Landscape lets you scan wider text sideways, after which the software automatically rotates the scan by 90 degrees so that everything is upright on the screen.

The tricky parts are getting the brightness level correct and scanning exactly vertically or horizontally – but this comes with experience. As it happens, Migraph OCR does not complain at all if a scan is slightly skewed – no more than five degrees off true in my experience – the scan can still be read by the OCR software, although it takes a little longer and misreads characters more often because the software has to work with its head tilted to one side, as it were. The more skewed the scan, the longer it takes to interpret and the more mistakes are made.


PROTEXT V5.532 (c) 1992 Arnor. Program MIGCR.TXT (XX)
Ch 1 Line 1 Col 1 No markers set Ins AI $ 15:41:46

In a shock mid-summer
move, Commodore will
this week drop the price
of the A600 to £299_
The surprise £100 reduc-
tion for the flagship machine
will leave room for a £399 big
name bundle later in the year
and also consolidate what
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According to new UK
managing director Kelly
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reliability of the new Amiga.
He told CTW: "We had to
be sure that we could afford
the drop and the first return
rates for the A600, showing
at less than one per, cent
made it certain."
The A600HD will remain at
£499. Sumner explained that
the cost of hard d rives makes

Saving the text as 'lines' results in the original column width being maintained and a carriage return at the end of every line

Migraph OCR has been written with hand scanners very much in mind. The developers have realised that many people may want to scan wide A4 pages of text, and have included an Append facility to the saving of text so that three or four Landscape strips of page can be scanned, read and saved one after the other, resulting in the one file of ASCII text. If you are using a scanner not supported by the software, then you would need to import each scan and rotate it before letting OCR loose on it, but you can still append the text to the ASCII file created by the previous scan.

Owners of flatbed A4 scanners, of course, will not have this problem because the full page can be scanned, imported and interpreted in one session. But it's worth pointing out that 300 dpi is the minimum resolution required; the software will certainly read 200 dpi scans and try to interpret them, but anything below about 15pt text is hard work and probably quicker to type in yourself.

Once the scan to be processed is in Migraph OCR, whether scanned directly or imported, it's time to do some optical character recognition.

> **"Migraph OCR has been written with hand scanners very much in mind"**

'I KNOW THAT FACE'

Migraph OCR uses 'Omnifont technology', which is the feature analysis method of character recognition described earlier. The manual says it has been pre-trained on 20 typefaces: Artisan, Bookman, Brougham, Caroll Pica, Courier, Courier Italic, Delegate, Elite Modern, Helvetica, Herald Elite, Letter Gothic, Lori, Lubalin, OCR-B, Pica, Prestige Elite, Prestige Italic, Prestige Pica, Times, Titan and Title. (I make that 21 typefaces, but who's counting?)

It's fair to say that most of you won't be able to recognise by eye any of these typefaces, but this needn't concern you because you don't have to tell the software what typeface it is reading, the process is almost entirely automated.

On top of feature analysis, Migraph OCR has context sensitive linguistic databases. These are Proximity-Merriam-Webster for English, and Proximity-Collins for French and German. It also has the ability to train the software to recognise and remember questionable characters and even complete typefaces. So from a 'technical specs' point of view, Migraph OCR really is the bee's knees, right on the cutting edge.

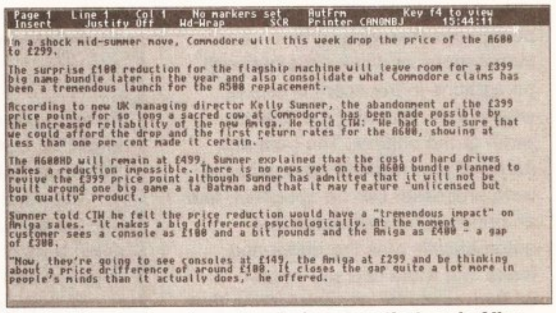
Before you can start processing the scan there are one or two things you might want to tell the program. Like in what order the columns of text should be processed, and which part or parts of the scan should be ignored – your scan may have a graphic on it, for instance, or a large dropped capital, and you will probably want the software to ignore these.

This is achieved by drawing 'clip' boxes around areas of the scan. For a scan of text in three columns, for example, you would draw a clip box around each of the three columns; the box you draw first will be processed first, the one you draw second will be processed second, and so on and so forth. If you muck up the order in which you draw the clip boxes the software will let you rearrange the 'sort' order.

Of course, some pages you scan may have graphics on them in awkward positions, busting into the text with the text running around them. Migraph OCR deals with this problem by allowing you to draw 'polyline' clip boxes as well as simple rectangular ones. This makes it easy to click around the boundary of a graphic in order to exclude it from the finished clip box.

And if drawing polyline clip boxes proves awkward or confuses you, Migraph OCR will let you draw a series of overlapping rectangular clip boxes and will then automatically combine them to form a polyline box. Nice touch.

After a clip box has been drawn it can be finely adjusted by dragging control points or 'handles' at the intersection points. A 'thumbnail' representation of the whole scan can be viewed to position the bounding boxes approximately, then there are two magnification levels if accurate adjustments need to be made. You can move about the magnified scan


Page 1 Line 1 Col 1 No markers set AutFrm Key f4 to view
Insert Justify Off Wd-Wrap SCR Printer CANONBJ 15:44:11

In a shock mid-summer move, Commodore will this week drop the price of the A600 to £299.

The surprise £100 reduction for the flagship machine will leave room for a £399 big name bundle later in the year and also consolidate what Commodore claims has been a tremendous launch for the A500 replacement.

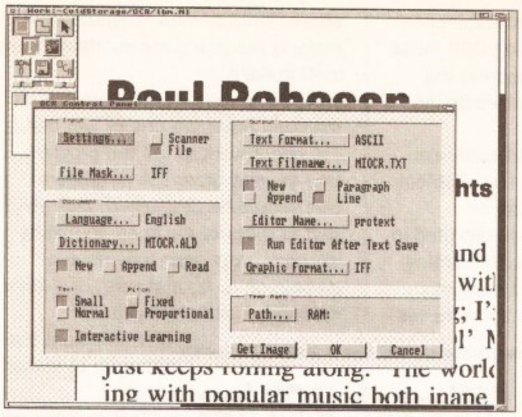
According to new UK managing director Kelly Sumner, the abandonment of the £399 price point, for so long a sacred cow at Commodore, has been made possible by the increased reliability of the new Amiga. He told CTW: "We had to be sure that we could afford the drop and the first return rates for the A600, showing at less than one per cent made it certain."

The A600HD will remain at £499. Sumner explained that the cost of hard drives makes a reduction impossible. There is no news yet on the A600 bundle planned to revive the £399 price point although Sumner has admitted that it will not be built around one big game a la Batman and that it may feature "unlicensed but top quality" product.

Sumner told CTW he felt the price reduction would have a "tremendous impact" on Amiga sales. "It makes a big difference psychologically. At the moment a customer sees a console as £100 and a bit pounds and the Amiga as £400 – a gap of £300.

"Now, they're going to see consoles at £149, the Amiga at £299 and be thinking about a price drifference of around £100. It closes the gap quite a lot more in people's minds than it actually does," he offered.

Saving the text as 'paragraphs' means that end-of-line hyphenations will be removed and each paragraph is saved as one long line with a carriage return at the end of it, making for easier formatting in your word processor



The Settings requester is uncomplicated, but I wish Migraph had used ticks to show when something has been selected instead of coloured-in squares

by means of horizontal and vertical sliders, or by a locator gadget.

Now, one of the worst aspects of complex programs is that sometimes they can be difficult to set-up simply because of the sheer number of different configurations possible.

EASY TO SET UP

Migraph OCR isn't like that. The Settings panel is divided neatly into four sections. The Input section wants to know whether the scan is going to be coming from a scanner or a file, and if it's a file it needs to know which graphics format to expect from IFF, TIFF or IMG – or an intelligent '#?' option tells the software to investigate the file to be imported and act accordingly, which is a much more sensible idea.

The Output section is no more difficult. Output format can be selected, although currently only ASCII is supported; I imagine Migraph is considering support for the popular Amiga word processor formats, should the need arise, but in the meantime they can all read ASCII so there's no real problem.

The output filename is specified here, along with whether you want the data appended to an existing file of the same name, and whether the output should be written as paragraphs (recognised by indentations or blank lines between paragraphs in the scan) or lots of single lines, retaining the column width of the original. The path and name of your favourite text editor or word processor can be specified, and an option can be selected that automatically runs the editor and loads into it the text you've just OCRed, ready for any corrections that may or may not need to be made. Note that to use this feature you'll need plenty of memory because Migraph OCR isn't closed down – the text editor or word processor will be multi-tasked.

One final output setting allows you to select a graphics output format of IFF (ILBM) or TIFF. Areas of your scanned page can be specified as graphics and subsequently saved, but I would guess you won't be using this feature very often except maybe to save the odd line drawing or logo, or perhaps to save the entire scan for posterity.

The Temporary Path setting allows you to specify where Migraph OCR should save files when it needs to cache data. If you've got 6Mb of memory or more, you can safely specify RAM: here, which helps to speed things along now and then.

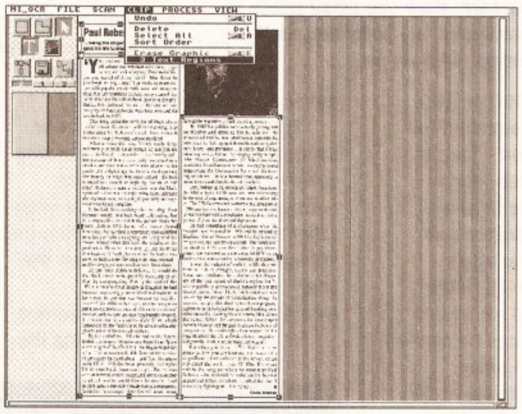
The most complex part of the Settings requester is the Documents section. The Language setting is obvious enough, but the Dictionary setting can be confusing at first, and it is important to understand how it works. This dictionary isn't the context sensitive lexicon database, it's your 'user-defined' dictionary for training the software to recognise new characters.

> **"Areas of your scanned page can be specified as graphics"**

You can New, Append or Read this dictionary. New means create a brand new dictionary of the specified name, overwriting any dictionary of this name that already exists (you will be asked to confirm before overwriting). Append means add any new characters that you train it to recognise during this OCR session to the dictionary of the specified name. Read means use the dictionary of the specified name to try to find any characters that aren't recognised, but don't add any new ones to it.

The idea is that you create specific dictionaries for specific typefaces or publications. Say, for example, you regularly scanned and OCRed articles from *Amiga Shopper*, then it'd be sensible to create a New dictionary called 'Shopper' on your first session, and Append to this dictionary on every subsequent *Amiga Shopper* OCR session. After a while the software will know all about *Amiga Shopper*'s typeface, and will sail through scans like a knife through butter. Scans from other publications or documents, however, would be saved to a dictionary of another name.

It would be perfectly possible to create one massive user dictionary covering every different typeface you ever scanned, but this would slow things down to a crawl because the whole user dictionary would have to be searched every time. It's better to have smaller and more precise dictionaries for every occasion.



Using a flatbed scanner you can import a whole page. Any graphics on the page can be 'clipped' and saved if required, or deleted if you want rid of them

Text and Pitch have to be specified in the Document section as well, which is the closest you get to telling the software which typeface to expect. Small (under 10pt) and Normal (10-18pt) are your choices of text, Fixed and Proportional are your choices of Pitch.

The final Document setting specifies whether you want Interactive Learning or not. If this is not selected the program goes into Automatic mode and any characters it fails to recognise precisely will be replaced with its best guess or, if it's really stuck, with an '@' character.

Until you've built up a few user dictionaries you should have Interactive Learning switched on.

All these settings can be saved to a default configuration file that gets loaded automatically when you run the program; alternatively you can save configuration files under personal filenames to be loaded by yourself at the appropriate time.

TEACHING IT TO READ

At last we've arrived at the actual job in hand, the optical character recognition stage. So it's time to click that button... The job is completed in several 'behind the scenes' phases during which decisions are made with the help of the main dictionary, any user-dictionary specified, and the lexicons. The time this takes depends on how large the scan is, the quality of the scan, how skewed the scan is, and whether it already knows about the particular typeface(s) it finds. On an Amiga 500 Plus with GVP hard drive and 4Mb of memory, for a handscanned 4in by 4in area of text these phases take about two or three minutes to complete; on an Amiga 3000 it usually takes well under a minute for even a full A4 scan of maybe 1,000 words.

Once these phases have finished you are presented with the Interactive Learning requester so that you can tell the software what to do about any unrecognised characters. The way this Interactive Learning requester works takes a little getting used to, and you're bound to muck it up a few times to begin with, but the procedure soon falls into place.

At the top of the requester is a box showing the ASCII version of the last few lines of text that have been processed, with the word that contains the unrecognised character inverted at the end of the display. Below this is a much smaller box showing the scanned version of the same word; the unrecognised character is displayed in black, the rest of the word is ghosted.

Below this is another box, with a string gadget containing what the software thinks the unrecognised character is. If the software is wrong, you can delete this character and correct it.

Many of the unrecognised characters Migraph OCR throws up will be two or three characters that by design or fluke are touching. For instance, some character pairs that

THE ALL-IN-ONE SOLUTION

If you're interested in OCR but don't own or have access to a scanner, it might be worth considering buying the two together in AlfaData's 'AlfaScan Plus with OCR' package, thus saving yourself a few bob.

The hand scanning software supplied is the excellent *Touch-Up*, plus the *Merge-It* utility that allows you to join two narrow scans together to make a wider one. The scanning head is the standard Marstek unit supplied with almost all Amiga hand scanners.

The version of Migraph OCR included in the bundle is the same as the version reviewed here, except that the File Import option has been disabled, so you can only OCR pages that you scan directly into Migraph OCR using the supplied AlfaScan Plus scanner.

are tightly kerned (pushed closer together, in other words) will be presented to you for confirmation – it's amazing how often the software's best guess is correct.

There are two ways of confirming a character (or sequence of characters), by Accepting or Training. Accepting means the character won't be remembered, so the next time the software comes across the same thing it won't recognise it and will ask for confirmation again. Training means the character will be remembered for the rest of that session, plus subsequent sessions if you are saving a user dictionary.

Two buttons in the Interactive Learning requester allow you specify a 'default' confirmation. This enables you to speed up the process significantly by simply pressing the Return key instead of having to take your hands from the keyboard to grab the mouse and click a button; alternatively you can hit the assigned function key.

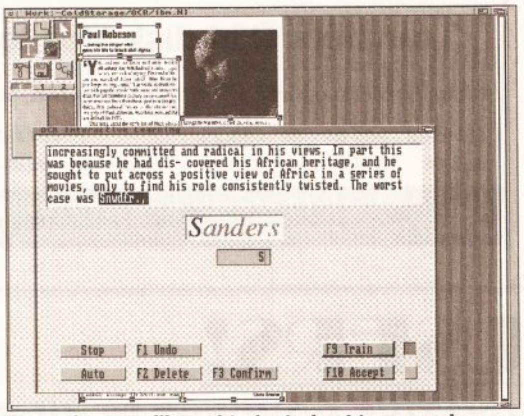
Sometimes the software will guess that a sequence of touching characters is just one character, and this character is presented for editing in the string gadget. If, say, the sequence should be 'rme' and the software has guessed 'w', then you can delete three spaces backwards, enter 'rme' and press Return. This procedure is probably the most difficult to get used to, along with what you have to do when a broken-up or badly scanned single character is guessed as being two separate characters; the technique here is to correct and Accept the guess in the string gadget for the first half of the character, then when the second half is presented to you, delete it using the Delete gadget or the appropriate function key.

Should you suddenly realise you have made a mistake, there's no need to panic because the software remembers the last 15 unrecognised characters and will allow you step back and correct them.

DOES IT WORK?

Migraph OCR is extremely easy to use; the manual is hardly needed. The most important thing you have to remember is that if you keep overwriting the user-dictionary by having New selected during every OCR session, then the software is going to be continually asking you for confirmation, slowing down dreadfully a process that you will eventually want to be as automatic and quick as possible.

You must remember to create different user-dictionaries for different typefaces, and you have to remember to Append to these dictionaries every time you have an OCR session using that typeface. This way, gradually you will be asked to train the software less and less until, eventually, the software will be able to go it alone. How long this will take will depend on how much OCRing you do.



The software will need to be trained to recognise most italic typefaces because they are normally tightly kerned – that is, the bottom half of letters tuck underneath the top half of preceding characters

To be completely objective about how accurate Migraph OCR can become, and how quickly it can learn, I would have to test it for a long, long time.

You will appreciate, I'm sure, that I don't have that time because you want to know about this software now – not next year. So I gave it a really cruel test...

I picked a page of text at random, handscanned it, OCRed it, and then counted how many mistakes it made.

The software was not pre-trained on the typeface, so I had to go through the Interactive Learning process with it. After I had trained it on the unrecognised characters in this one scan, I imported the scan afresh, instructed the software to Read the user-dictionary I created, and then set it off on Automatic.

The scan was of a 3in by 10in column of 10pt typeset text from a magazine. It contained 3,364 characters (608 words). The text file the software created contained just one mistake, misreading an apostrophe as a comma, maybe because the scan was slightly skewed in the middle.

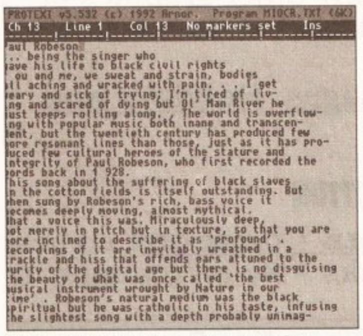
> ***"...27 mistakes in 3,364 characters. That's a 99.17% success rate"***

However there was a further complication in that a number of spaces had been inserted into the text where they shouldn't have been – mainly before full stops and commas, but also in the middle of a few words – 26 of them in all. So being really hard on it, there were 27 mistakes in 3,364 characters. That's a 99.17 per cent success rate.

The spaces before punctuation marks were dead simple to put right in my word processor using a quick search and replace operation. The apostrophe and the spaces in the middle of words I had to correct by hand, although a spelling checker helped. It took me five minutes to scan and OCR the page, plus a further minute to clean up the 608 words produced. Six minutes in all. That's 100 words per minute, as fast as a professional speed typist. Speaking as a three-fingered typist, it would have taken me half an hour to type 600 words.

Is Migraph OCR too good to be true? That's what I thought, so I tried again with another scan and a smaller typeface, 9pt this time. I ended up with 40 mistakes in 5,295 characters (935 words), a 99.24 per cent success rate. Again a lot of those mistakes (15) were unwanted spaces before punctuation marks. And this time I noticed (for the first time!) that because I'd saved the text as paragraphs (as opposed to lines), the hyphenations in words at the end of lines in the scan had been automatically removed and the two halves of the word joined together.

It's obvious that Migraph OCR delivers, and when you consider the cost of equivalent software on the PC, Migraph OCR seems a bargain. OK, it's not 100 per cent perfect, no flexible OCR software is (yet), but I think we can live with 99 per cent accuracy for the moment. AS



Saving text as 'lines' can make editing and formatting the resultant file hard work. Best to select 'paragraphs' whenever possible

GET AN OCR UPGRADE – FREE!

There were a couple of slight problems with V1.0x of Migraph OCR, and Golden Image (UK) Ltd is offering a free V1.1 upgrade to owners who have earlier versions, whether it is the full version or the version that comes with the 'AlfaScan Plus with OCR' package. Phone Golden Image on 081-365 1102 for more details.

CHECKOUT MIGRAPH OCR VERSION 1.1B

Ease of Use ●●●●●
A couple of goes and you're an expert. Hand scanning in a straight line is the difficult part to master.

Features ●●●●○
ToolTypes support Workbench or Custom screen in two or four colours (PAL/NTSC, HiRes/HiRes-Interlaced, plus user-defined Overscan sizes). The only feature it lacks is the ability to edit the user dictionaries. It's a real pain when you accidentally save a bum character because the only way to remove it is to trash the whole dictionary and start again

Speed ●●●○○
The OCR itself is quite quick but the interface could do with some speeding up. It can take a couple of minutes for the program to load and for the Migraph screen to appear.

Documentation ●●●○○
Does all that is required of it. Any bigger and people would complain.

Price Value ●●●●●
It's terrific value, well less than half the price of equivalent PC software.

Overall rating ●●●●○
Stunning stuff. But remember that you need a hard drive and you're bound to have the odd problem if you have less than 4Mb of memory.

SHOPPING LIST

Migraph OCR £160
by Migraph Inc,
32700 Pacific Highway South,
Suite 12, Federal Way, WA 98003, USA
☎ 0101-206-838-4677

AlfaScan Plus with OCR......... £249
by AlfaData Computer Technic Corp,
3FL, No. 8 Lane 263, Chung Yang Road,
Nan Kang, Taipei, Taiwan

Both distributed in UK by:
Golden Image (UK) Ltd, Unit 12a,
Millmead Business Centre,
Millmead Road,
London N17 9QU
☎ 081-365 1102

Paul Overaa test drives the new HiSpeed Pascal package from HiSoft

IN THE FAST LANE

HiSpeed Pascal has arrived. If you're thinking about learning a new language, is this the package for you? How does *HiSpeed Pascal* stand up to the competition?

When you open the package you'll find two manuals and three disks – separate program disks are provided for Workbench 1.3 and Workbench 2 users and the third disk contains the system's unit files (units are libraries of predefined functions, procedures and data).

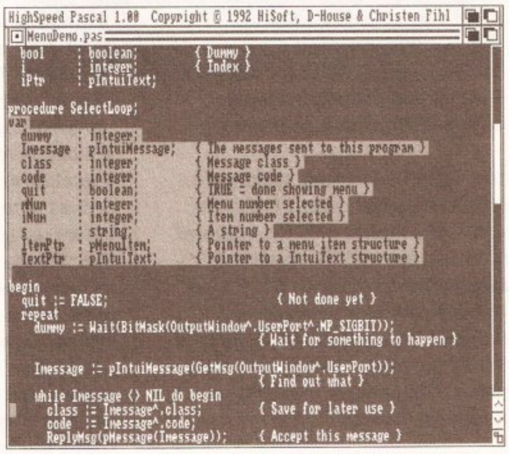
The manuals are up to the usual high standard of HiSoft-related documentation. A user manual and a technical reference manual are supplied (containing 202 and 278 pages respectively). The user manual provides an introduction to the system and deals with the editor, compiler, debugger and other tools. There's also a section introducing a number of Amiga-specific operating system issues including the use of the system's Amiga units and their connections with the library, device and resource mechanisms.

The technical reference manual deals with the syntax of the language and the HiSoft/D-House implementation. Also included are more unit descriptions (namely the DOS, System and Graph units).

The material of both manuals is well written. My only niggle is that I would have preferred to have seen the operating system support chapter of the user guide moved to the technical reference manual because that way all the unit documentation would have been together.

THE HISPEED PASCAL EDITOR

This makes extensive use of the Workbench 2 way of doing things – you'll find action and check-box gadgets, radio buttons and gadgets which cycle through various options as they are selected. The editor lets you work with multiple files and enables you to open multiple windows into the same file (this is handy for multiple copy and paste operations between areas of the same program because you do not have to keep moving between the source and destination sections).

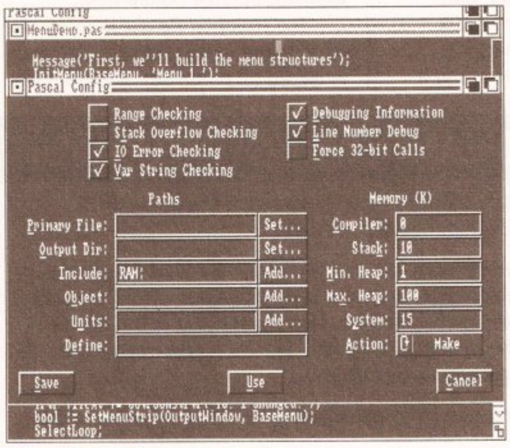


***HiSpeed Pascal*'s editor program**

Clipboard cut/copy/paste facilities are provided and these are mouse-controlled, ie by holding the left mouse button down and wiping the mouse over the area of program-code you wish to mark for copying.

There is a macro facility which lets the editor learn, and re-play, any useful sequences of keystrokes and some good requester-based 'find' and 'find-&-replace' options are also provided along with a bookmark scheme which allows you to insert place-markers into a program file. In addition to this there are options for defining all the usual types of global settings for tab size, end-of-line behaviour, auto indenting, automatic back-up creation and so on. Most editor settings can be saved to disk and when the editor has been asked to create project icons, things like bookmark settings can also be stored along with the project.

Not only can the compiler options be controlled directly from the editor but you can also compile and run your programs. Automatic location of errors in the source after a failed compilation is provided and the net result is that *HiSpeed Pascal* offers an environment which enables you to create, load and save, compile, edit and run finished programs directly from the editor's menu system.



Compiler settings are easily adjusted within *HiSpeed Pascal*

There are far more options than space permits us to talk about but the important thing is that the *HiSpeed Pascal* environment, which like *Devpac 3* uses the editor as the main anchor point, provides a level of integration which will appeal to new-comers and experienced users.

THE COMPILER

This can be used as a stand-alone program or from the integrated environment provided by the editor program. Options are available for range, stack overflow, IO error and string length checking and for the inclusion of varying amounts of debugging information.

The compiler is largely compatible with *Turbo Pascal 5.0* for the PC. This is a big advantage because it means that the large

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BEGINNERS **BEGINNERS START HERE** **BEGINNERS**

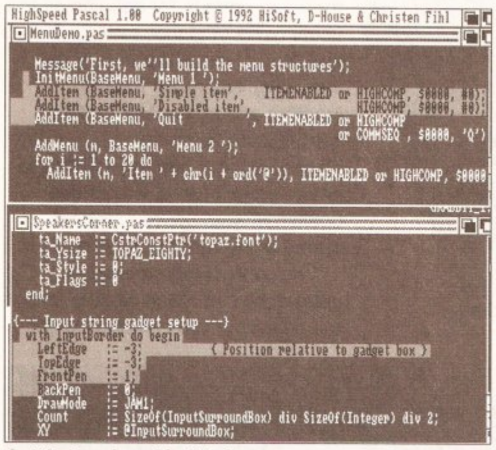
Pascal is a powerful high-level language beloved of academics. Unlike languages such as Basic and C, which still let the programmer take liberties with code, Pascal has strict rules. In fact, the Pascal way of doing things works to the advantage, rather than the disadvantage, of the programmer. With Basic type languages for instance you might start off a program using a variable called MESSAGE$ but, whilst using this later in the program, might mis-type the variable's name and write MESAGE$ or forget the $ identifier and write MESSAGE.

Basic is happy to let you do this and on seeing these variable names will actually create new variables for you. The net result at the end of the day is that your program will not work as intended. Pascal does *not* let you make such mistakes. If you do try to use a variable that has not been properly declared the compiler will tell you.

Pascal also has useful conventions concerning functions and procedures and the data they work with. It is because of these and other benefits that Pascal has a high profile in colleges and universities. In fact most serious books on algorithms and program design tend to adopt Pascal or Pascal type pseudo-code as the vehicle for their explanations.

Pascal is a well standardised language and there is an ISO (International Standards Organisation) standard available. Having said that, the language does come in a number of 'flavours' and Borland's *Turbo Pascal*, because of its popularity in the PC world, needs a mention. By the sheer size of its user base *Turbo Pascal* has created its own 'defacto Pascal standard' and there are a great many *Turbo Pascal* books and PD programs available.

amount of software and books available to *Turbo Pascal* users will be useful to the *HiSpeed Pascal* user. However, the *HiSpeed* compiler does not currently implement the



Cutting and pasting between different projects is very easy

new 'object orientated' language extensions which were introduced with *Turbo Pascal 5.5*. The *HiSpeed* compiler, as might be expected, is also similar to the Atari ST version and any problems when porting *HiSpeed Pascal* applications from the ST are likely to stem from data rather than program portability issues (see later).

THE DEBUGGER

The low-level *Devpac* debugger, *MonAm*, has been included with the package. It's a symbolic multi-window debugger able to step through a program displaying code instructions, 68000 register contents, processor status, and memory contents in hex or ASCII form as it does so. If debugging information has been included in a program *MonAm* can use it to display the original program labels. *MonAm* is very powerful but as far as the Pascal code is concerned it suffers from one major disadvantage, namely that some experience with 68000 assembly language is needed in order to use it.

HiSpeed Pascal provides a couple of additional utilities: *LibMaker* lets you combine units to make a customised library file that the compiler can use to give faster compilations. *FDToPascal* generates skeleton units from Commodore style function description files.

THE AMIGA CONNECTION

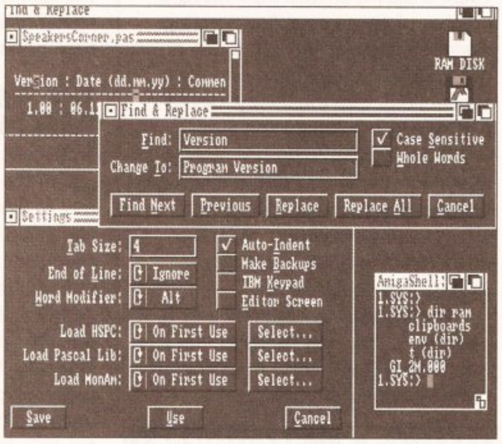
HiSpeed Pascal comes with a number of units which give access to the Amiga's operating system (many of the example programs supplied with *HiSpeed Pascal* illustrate the use of these unit functions). While the manuals provide a good overview, users intent on accessing these components will (as with all languages) need to obtain the appropriate system documentation.

The Amiga uses a system of shared library, device and other hardware resources and a program must ask the operating system for access permission before using them. The Exec library, which includes functions which allow you to open other system libraries, does not need to be explicitly opened and since *HiSpeed Pascal* itself opens the DOS library a *HiSpeed Pascal* program can use both Exec and DOS functions (via the *HiSpeed Pascal* supplied DOS unit) directly. Other libraries, and the Amiga's device and resource facilities, have to be explicitly opened before use.

The *HiSpeed Pascal* interface for all of these system support facilities is based on a number of units each of which encapsulates a single library, device or resource. These units provide all the relevant system header information (ie the data structures and predefined constants), together with the associated procedures and functions.

These system-related issues will clearly *not* affect a Pascal newcomer at first but when it does become necessary to investigate and use the run-time libraries and devices you will require the appropriate system documentation (ROM kernel manuals and the like) and some knowledge of the C language. A brief summary of C has been included in the *HiSpeed Pascal* user manual.

Having said that, you only need travel down this road as far as it suits you. *HiSpeed Pascal* provides in-built DOS, CRT and Graph units which provide high-level Pascal type access to a great many graphics and display routines. The Graph unit for instance enables you to write programs using facilities equivalent to those provided by the Borland Graphics Interface for the PC. The advantages are that you can use them without being Amiga-System literate and that your programs will be more portable. Many users will find that these unit facilities are more than adequate for all their graphics and system function needs.



***HiSpeed Pascal* makes good use of the Amiga's multi-window environment**

DATA PORTABILITY

While many Pascal programs will be available to Amiga *HiSpeed Pascal* users with little change, there could be minor problems with moving data from the PC and, to a lesser extent, from the Atari ST. Since the ST uses the same processor there won't be any byte ordering problems, but the ST and the Amiga use different end-of-line conventions on their text files which may be something requiring attention (basically the ST uses a carriage-return/linefeed pair to signify the end of a line in a text file whereas the Amiga uses a single linefeed character).

With PC written data there are additional snags including the fact that the 80x86 based *Turbo Pascal* compiler uses a byte ordering convention which is the reverse of the 68000 based *HiSpeed Pascal*. None of these things will cause serious problems. As far as byte ordering is concerned, *HiSpeed Pascal* has SwapWord, Swap and HiWord instructions so that such changes can be made within the program reading the data.

IN USE

Most of the *HiSpeed Pascal* environment is very user friendly. The editor is a joy to use and the compiler, since it is menu driven from the editor, appears to be almost transparent. All the new user really has to worry about is writing programs.

The same cannot be said of the debugger because of the need to understand 68000 assembly language. My advice to the new user would be to ignore *MonAm* and debug programs by listing them, thinking about them, and using Writeln() statements to dump important values back at the console.

LAST WORDS

Pascal is an important language and despite the high profile of languages such as C on the Amiga this HiSoft/D-House offering deserves to do well. Because it enforces good programming discipline, Pascal is ideal for beginners. Amiga programmers who are Pascal-literate will know only too well the advantages which the language offers – I for one will be taking a long-term interest in this product! AS

JARGON BUSTING • JARGON BUSTING • JARGON BUSTING

Algorithm – A description, based on a defined series of steps, which enables some task to be performed.

Byte Ordering – Microprocessors can use two conventions when storing addresses and data items which consist of more than one byte. Some, like the Motorola 680x0 chips place the most significant bytes of the object first. Others, such as the Intel 80x86 series, use the reverse convention (ie they place the least significant bytes first).

Syntax – Rules of a computer language which govern how it can be used.

Unit – A precompiled collection of Pascal functions, procedures and data.

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CHECKOUT HiSPEED PASCAL

Ease of Use ●●●○○
The Editor's Intuition/Workbench 2 style of doing things is superb but the *Mon-Am* debugger may not be that useful since it needs the user to be familiar with 68000 assembly language.

Features ●●●●○
A powerful, well implemented, package.

Documentation ●●●●○
Good, reliable, documentation.

Speed ●●●○○
Editor and compiler have performed well.

Price Value ●●●●○
Borland's *Turbo Pascal* has done much to bring down the prices of Pascal compilers and it is in packages such the HiSoft/D-House package that we see the benefits.

Overall rating ●●●●○

At the risk of sounding like HiSoft's PR department this is another HiSoft package to get the 'thumbs up' at *Amiga Shopper*!

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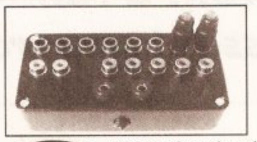
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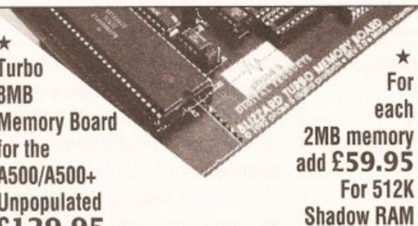
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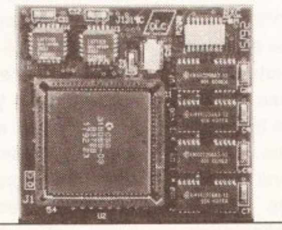


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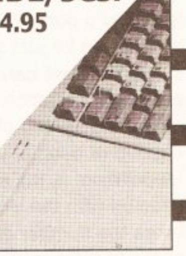
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How to create CHAOS

Last month we discovered how an ordered structure could be created from a random process. This month Conrad Bessant generates chaos from order

A lot of popular chaos theory is quite abstract, the Sierpiñski gasket and the Mandelbrot set being prime examples. These two objects could not exist in the real world and have no links to nature. However, much of chaos theory, particularly the early material, is based on the natural world.

One such example is the investigation into the growth and decline of populations by the biologist Robert May. He developed a simple equation, the May equation, which simulated the erratic fluctuations of populations. This equation forms the basis of one of the most interesting fractals, the Feigenbaum diagram, named after eminent chaos researcher Mitchell Feigenbaum.

The Feigenbaum diagram represents the opposite situation to that of the Sierpiñski triangle. That is to say that a complex, and in places chaotic, structure is generated from the very simple, non-random, formula which May derived from population dynamics. The accepted name for a non-random process such as this is a deterministic process.

THE MAY EQUATION

There isn't space here to explain how May's population equation is derived, so I'll just state it and explain how we can use it. In this article the equation will be used to model the spread of a virus through a group of people, in this case the 'population' is the number of people infected with the virus. The equation takes the number of people infected at the beginning of a week (in the variable p) and uses it to calculate the number of people infected at the end of the week (p_{new}). The equation is:

$$p_{new} = p + c * p * (1 - p)$$

This basically states that the number of people infected at the end of the week (p_{new}) is equal to the number of people infected at the end of the previous week (p) plus the number of people who have been infected since then. The number of people infected during a week is $c*p*(1-p)$, where c is the contamination constant, which represents the success rate at which the virus spreads and persists in the human body. Different values of the contamination constant can be used to represent different viruses.

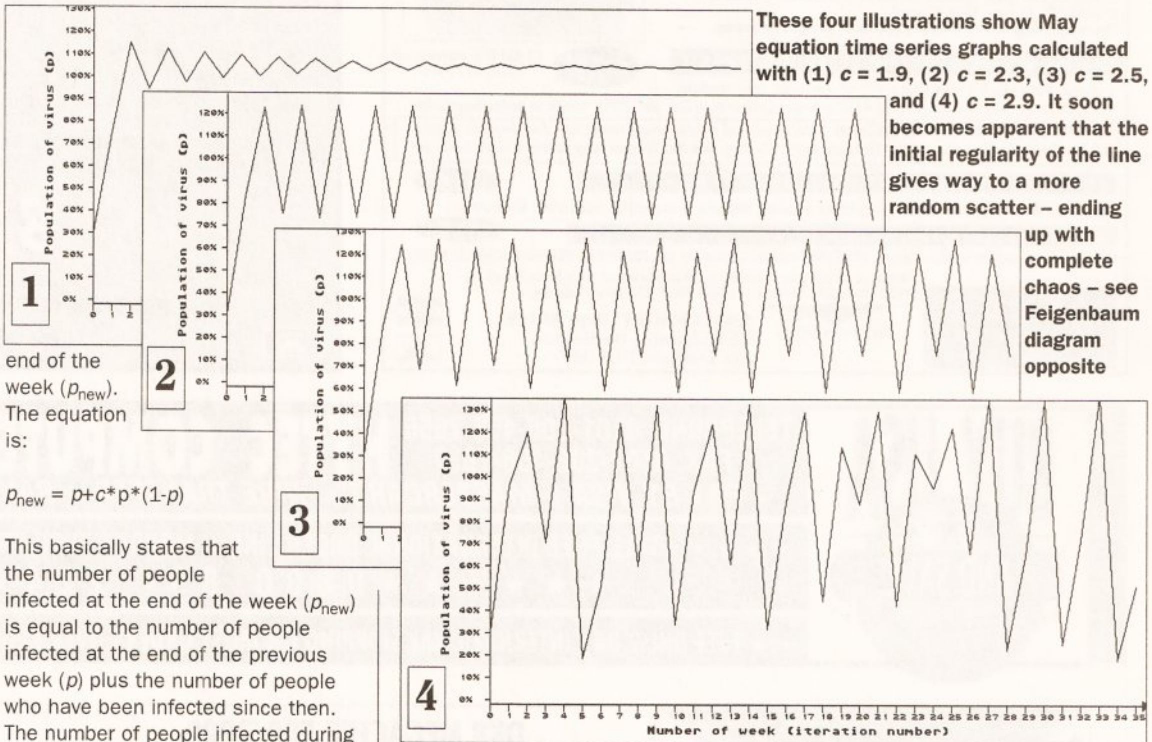
Note that the populations p and p_{new} are not absolute values, they are percentages, so if the population is 30% then 30% of people are infected. Of course, Amiga BASIC can't handle percentages directly so we use fractions instead, for example if 1% of people were infected at the beginning of the week we would say that $p = 0.01$.

Now that we know what the symbols mean we can use the equation to predict the likely number of infected people at the end of any week. Let's create a theoretical starting situation (call it week 0) at the end of which 30% of the group have the virus ($p = 0.3$). If the virus has a contamination constant of 1.9 ($c = 1.9$) the calculations to determine the number of people infected after the first four weeks are shown in the May equation calculation table.

The results are calculated by feeding the previous week's population into the next week's equation. The equation is thus said to be dependant on mathematical feedback. Like the Sierpiñski triangle, our population simulation is an iterative process, but in this case an iteration is defined as one application of the formula.

If more values are calculated for this value of c and plotted on a time series graph (a graph of population against time) we can see that the population swings back and forth before reaching 100% (see 1 above).

The initial swings in the population are easy to explain if we remember what the May equation represents. Populations below 100% occur when some people remain un-infected by the virus – when the virus is in a state of under-population. During such a period the virus thrives, but when the people become over-populated (the population is greater than 100%) many of the viruses run out of hosts and die, hence the population is reduced.



These four illustrations show May equation time series graphs calculated with (1) $c = 1.9$, (2) $c = 2.3$, (3) $c = 2.5$, and (4) $c = 2.9$. It soon becomes apparent that the initial regularity of the line gives way to a more random scatter – ending up with complete chaos – see Feigenbaum diagram opposite

MAY EQUATION CALCULATION TABLE

Time	Calculation	People infected (p)
Week 0:	p = 0.3	30%
Week 1:	p = 0.3 + 1.9 * 0.3 * (1 - 0.3) = 0.7	70%
Week 2:	p = 0.7 + 1.9 * 0.7 * (1 - 0.7) = 1.1	110%
Week 3:	p = 1.1 + 1.9 * 1.1 * (1 - 1.1) = 0.89	89%

LISTING 1 • LISTING 1

```
DEFDBL c,p
INPUT "Contamination↵
constant, c:",c
p=.3
PSET(0,200-p*140)
FOR week=1 TO 80
  p=p+c*p*(1-p)
  LINE -(week*8,200-p*140)
NEXT week
```

The second graph shows the population of the virus with $c = 2.3$. There is some oscillation before the virus settles down, but this time to a two point oscillation.

Further values for *c* give even more interesting results, for instance when $c = 2.5$ the population settles down to oscillate between four values (see 3). By the time viruses with a contamination constant of $c = 2.9$ are reached the graphs have degenerated into chaos (see 4), with *p* jumping between different values.

PROGRAMMING

A simple graph plotting program can be used to experiment with various viruses (ie values of *c*). An Amiga BASIC version of such a program is shown in Listing 1 above.

This program requests a value for the contamination constant *c*, and then performs the May equation for this value over a period of 80 weeks, drawing a time series graph (with time horizontally and population vertically) as it proceeds. No axes are plotted because the actual values are unimportant, the program simply demonstrates different behaviour patterns.

The main body of the program is the FOR...NEXT loop containing the easily recognisable May equation, and the LINE command which draws a line from one point to the next. Note that because the range of the week variable (1 to 80) is small in relation to the horizontal screen resolution (0 to 639) used by LINE, the x position passed to LINE must be multiplied by eight to use the whole screen. Similarly *p* has to be multiplied by 140 because of its small range (0 to 1.3).

Experimentation with this program should establish that:

- *p* always takes a few weeks to settle into a pattern
- In most cases the higher the value of *c* the more values *p* oscillates between
- *p* always oscillates between an even number of values (except in the chaotic regions, and when *c* is one of a certain set of values, try c=2.83)
- Values of *c* above 3.0 give meaningless results

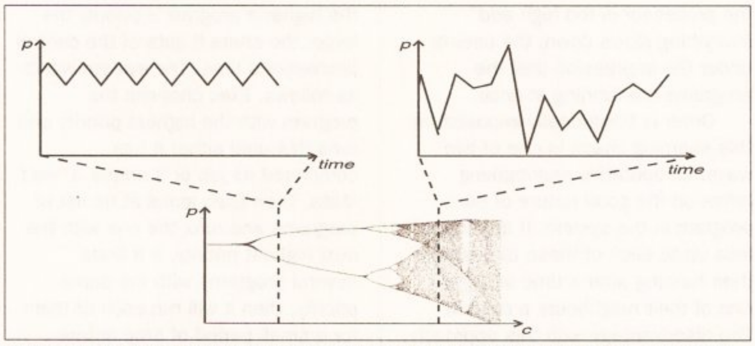
It would be difficult to find the exact value of *c* at which the oscillations go, say, from one to two numbers using this program. A better way is to combine the graphs of all the possible values of *c* into one. The composite graph that results is referred to as the Feigenbaum diagram (see below). Generating this is simple because we already have a program to calculate successive values of *p*.

To draw the Feigenbaum diagram it is necessary to compress the time series graph for each value of *c* so that it fits into one vertical column of pixels on the screen. All of these compressed graphs are then drawn across the screen so that they form a map of *p* against *c* (see the Amiga BASIC program in Listing 2). This differs from Listing 1 in that:

- The virus population is now calculated for 100 weeks. Because the system relies on feedback the first 50 calculations are performed to ensure that *p* has stabilised, but they are then ignored and only the second 50 are plotted.
- All points on the graph are now plotted at the same horizontal position and are not connected by lines so oscillatory patterns are easily identifiable.
- A FOR...NEXT loop is used to generate values of *c* between 1.8 and 3.0 (values below 1.8 are not of interest because they stabilise at a single value).

LISTING 2 • LISTING 2

```
DEFDBL c,p
FOR c=1.8 TO 3 STEP .001925
  p=.3
  FOR week=1 TO 100
    p=p+c*p*(1-p)
    IF week>50 THEN
      PSET ((c-1.8)*520,↵
200-p*140)
    END IF
  NEXT week
NEXT c
```



Squash up all the May time series graphs for different values of c, put them side by side, and you get the Feigenbaum diagram shown here

FURTHER EXPERIMENTATION WITH THE FEIGENBAUM DIAGRAM

The Feigenbaum diagram is one of the few fractals that can make use of both sound and colour. By playing a note proportional in pitch to the value of the population, *p*, whenever a point is plotted the sound can be used to give an audio representation of how the Feigenbaum diagram (above) degenerates into chaos.

At the left hand side of the diagram the period is one, so the tone is constant, after bifurcation the tone oscillates between two pitches, and by the end of the diagram chaos has created random tones. Adding the following command after the PSET line is the easiest way to create the sound:

```
SOUND p*1000+200,1
```

To add colour, as well as the x and y position we need to know another piece of information to be represented in colour, for instance the number of times each point has been plotted, which is different in different sections of the Feigenbaum diagram. In the first section each point is plotted 50 times, in the second 25 times, and so on until points are rarely plotted more than once.

The default screen set-up used by Amiga BASIC only allows four colours to be used. It is therefore necessary, if we are to make full use of the Amiga's colour capabilities, to open a new screen with 16 colours before drawing the diagram. This can be done by adding the following two lines at the head of Listing 2:

```
SCREEN 1,640,200,4,2
WINDOW 2,"Colour Feigenbaum Diagram", ↵
(0,0)-(617,180),15,1
```

In simple terms these two lines open a high resolution, non-interlaced, screen with a 16 colour capacity and then open a window on that screen to which all subsequent Amiga BASIC output will be sent. The colour plotting routine can now be incorporated into the program by replacing the PSET line with the following program fragment:

```
xp=(c-1.8)*520                !Calculate x and...
yp=200-p*140                  !...y position of ↵
point
oldcolour=POINT(xp,yp)        !Determine old colour
COLOR (oldcolour+1)↵
MOD 16                        !Set new colour
PSET(xp,yp)                   !Plot the point
```

The actual colour in which a point is plotted is determined by finding the old colour of the point with the POINT function and adding 1. Because we are limited to 16 colours, MOD 16 is taken of the colour value in order to keep the colour within the relevant 0 to 15 range.

WHAT DOES IT MEAN?

The Feigenbaum diagram is not one of the most attractive fractals but it illustrates how a simple, non-random, iterative process can produce a finely structured image in places with total chaos in others.

One result of much scientific study of the diagram is that conventions have been created to describe some of its most important features. The section of seemingly random pixels to the right of the diagram is loosely referred to as the chaotic region.

The point where a single line splits into two is called a bifurcation and the splitting, or bifurcating, which occurs at these points is referred to as period doubling, as the number of equilibrium states (the period) doubles. The period is the number of possible values that *p* oscillates between after stabilising, for example the section between 2.44 and 2.54 is period four.

By the very nature of period doubling almost all sections past c=1.95 have an even number of possible states, but there is a large 'window' of order in the chaotic region which is of period three.

The two way relationship between order and chaos, demonstrated here and in *Amiga Shopper* 18, represents a whole new way of perceiving natural processes occurring all around us. Although our simple virus population program has inaccuracies it still illustrates the important point that a natural process such as population growth and decline can be described in one simple equation.

Is it possible, then, that even the most complex natural processes can be reduced to simple equations, thus allowing them to be predicted with relative ease? This important question will be tackled next month when we discuss weather forecasting and strange attractors. AS

more FUN than ONE

Multitasking is one of the aspects of the Amiga that makes it unique among personal computers. Despite this, many users remain in ignorance of the feature and fail to get as much power from their machines as they might. In the first of a new series Cliff Ramshaw explains what it is and how to get the most from it...

A surprisingly large number of people aren't even aware that the Amiga can be made to run more than one program at the same time, yet this was one of its features which wowed everyone when the machine was first released. In fact, the Amiga is multitasking continually.

All the time your Amiga is switched on, a number of processes are at work. There's a program that reads the mouse port, another that scans the keyboard, a program that updates the system clock, several programs that contribute to the drawing of windows, and a program that decides which of the other programs should be running at any one time – and all of this before you have even begun to run an application such as *Deluxe Paint*.

If these programs can be likened to the largely unconscious internal processes that our brain concerns itself with, then a full-blown application can be compared to a task – such as washing the dishes – consciously undertaken on our part. It is here that the Amiga outperforms us, since it is quite capable of having, as it were, its hands in many sinks.

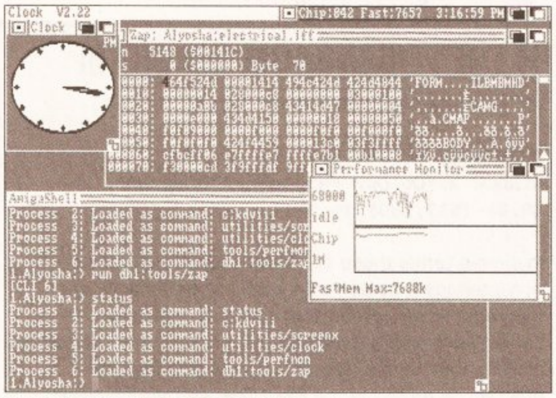
> **"Co-operative multitasking relies on the good nature of each program in the system."**

The Amiga only has one central processor – one device that can obey a program in the form of a list of instructions (actually there's the graphics co-processor or copper, but let's ignore that for the moment). Systems such as those developed by Inmos enable several processors to be linked, so that a separate program may be run on each processor. This is a hardware approach to multitasking; since the Amiga has only one processor it must rely on software simulation.

A PIECE OF THE ACTION

It relies on a concept known as 'time-slicing'. In fact only one program is ever running at any moment, while the rest are left idle. After an allotted period of time this program itself becomes idle and one of the waiting programs takes its turn. The swapping of the processor's attentions between each of its programs occurs so quickly that each program is under the illusion that it has the processor all to itself. And, unless the burden on the processor is too high and everything slows down, the user is under the impression that the programs are running at once.

Order is traditionally imposed on this seeming chaos in one of two ways. Co-operative multitasking relies on the good nature of each program in the system. It is more or less up to each of these to suspend their running after a time and give one of their neighbours a chance. The disadvantage with this approach is that if one program gets greedy then the others don't get a look in, and the system becomes multitasking in nothing but name.



Running more than one program from Workbench is a simple matter of clicking on a few icons

The system used on the Amiga is pre-emptive multitasking. With this approach there is one program that looks after the system and ensures that each program in turn gets its share of the processor. The program that does this on the Amiga is known as Exec.

Every program controlled by Exec has a number assigned to it which determines its 'priority'. Obviously, the higher a program's priority the larger the share it gets of the central processor's time. The system works as follows. Exec chooses the program with the highest priority and runs this until either it has completed its job or it enters a 'wait' state. Then Exec looks at its list of programs and runs the one with the next highest priority. If it finds several programs with the same priority, then it will run each of them for a small period of time before going on to the next.

The key here is the idea of a program waiting. Without it, some lower priority programs might never run at all. In reality, Amiga programs spend much of their time waiting. A program that requires mouse input, for example, will spend a large proportion of its time waiting to be told by the Input Device which, if any, mouse movements have been made. In a non-multitasking system this would be achieved by the program going into a loop, constantly asking the Input Device for input, until a valid input was received, at which point the program would get on with processing it.

This is very inefficient in a multitasking environment: the program would be hogging the processor when it was doing nothing more than waiting for something. Instead, Exec enables programs to state that they are waiting for a particular event. Once a program has done this, it is suspended, and Exec gets on with running any other programs it has to deal with. Sooner or later the Input Device (for example) will register a mouse movement. This information will be passed to the program that was waiting for it, the program will be taken out of its wait state and run, enabling it to process the information it has just received.

ALL UNDER CONTROL

Exec keeps a list of all programs under its control. Each of them can be in one of three states: actually running at the moment; ready to run once its turn comes; waiting for an external event, such as a message from the Input Device.

There are some potential pitfalls with this system. Imagine, for instance, two programs both accessing a hard disk. One program is busy reading information from one part of the disk, and then it is suspended while the other program takes over. This second program is perhaps reading from another part of the disk. With these two programs constantly swapping, the disk head would be skipping backwards and forwards across the disk surface like a crazy thing. To prevent this sort of thing happening, it is possible for a program, when using a resource such as a hard disk, to make exclusive use of it – no other programs can use that particular resource until the one that originally claimed it is finished.

Well, that's enough of the theory – any more detail is only of use to programmers, and can be found in the *ROM Kernel Reference Manual:*

Exec. So far we've discussed nothing but the bedrock of the system. It seems like here is no water, only rock. Let's look then at the actual uses to which it can be put.

One obvious use is to run an anti-virus program. For most of the time it will just sit there, doing nothing. But once a new disk has been placed in the drive, the anti-virus program will scan it for viruses and inform the user if any have been found. It is possible to load up such a program every time a disk needs to be checked for viruses, but it's far less hassle to have one running on the system all the time. Because the program spends most of its time waiting for a disk to be inserted, it takes up very little of the processor's resources and has no noticeable effect on the Amiga's speed.

I use the public domain program *Kill Da Virus*, which I keep in the c: directory of my system disk. To set it going, I include the following line in my startup-sequence, just before the 'LoadWB delay' line:

```
run <nil: >nil: c:kdviii
```

The AmigaDOS command 'run' sets another program running independently of the program that launched it (in this case the startup-sequence). The two peculiar clauses '<nil:' and '>nil:' are used to ensure that the console window is closed after the startup-sequence has finished. Although the virus killer operates from its own window, the 'run' command will also attach it to the window from which it was launched – in this case the window belonging to the startup-sequence – and this window will not be closed until the program being run has finished. To avoid this, the input and output of the virus killer are re-directed to 'nil'. This basically tells the program that it has no use of the console window, which can safely be closed even though the program is running.

THE SYSTEM CLOCK

Another simple example of multi-tasking is in the display of the system clock. Wouldn't it be nice to have the time and date constantly displayed at the top of the screen? Well, the following line in your startup-sequence, again just before the 'loadWB delay' line, will do the trick:

```
run <nil: n>nil: ↵
:utilities/clock ↵
digital1=240,0 24hour ↵
seconds date
```

As you can see, the command uses 'nil' in the same way as with the invocation of the virus killer.

One possible use of multitasking, which many people are unaware of, is to format more than one disk at the same time. In fact, you can format as many disks as you have disk drives. Simply stick them in, click on them and select 'Initialise' from the Disk menu of the Workbench screen.

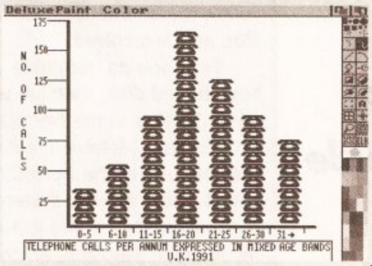
Of course, multitasking for most people means the ability to run more than one application at the same time. You might, for instance, be working in a word processor. Once you have finished writing your letter, you select print to get a hardcopy. Instead of waiting around for it to print, you can switch over to your finished document all ready to save on to it.

It should be obvious that the two primary requirements for good multitasking are speed and memory. Every new program run of necessity slows down the speed of all of the others already running. While the Amiga can quite happily handle two or three non-speed intensive applications running at once, you will really notice the difference if you try word processing while, say, a Mandelbrot generator is at work. If you need to do a lot of multitasking regularly, the solution is to buy an accelerator.

were part of memory: programs can be swapped between hard disk and memory as and when they are needed. Although this overcomes the limitations of insufficient memory, it has the side effect of further slowing everything down. At the moment, virtual memory is not an option for the average Amiga user, so buying more real memory is the only sensible option. As we've always said in *Amiga Shopper*, the more memory the better.

That's about all we have space for this month, but before I go I'll mention the intriguing situation of simultaneously running two copies of

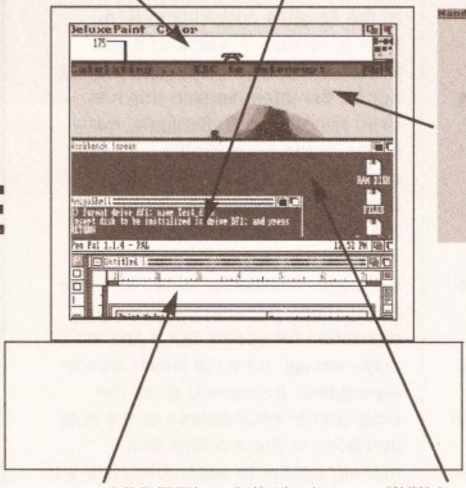
THE MANY SCREENS OF THE AMIGA

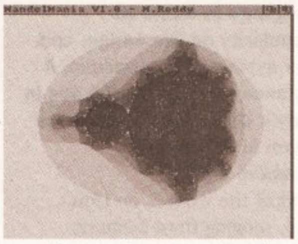


Deluxe Paint **runs on its own custom screen. This image could be saved to RAM disk and imported into** ***Pen Pal***

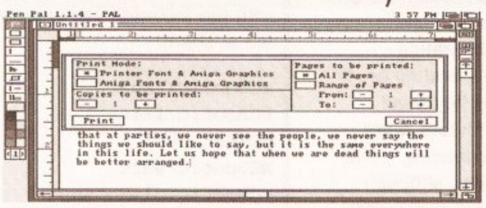


Meanwhile, a Shell window is open on the Workbench screen. The disk formatting program has been launched from here

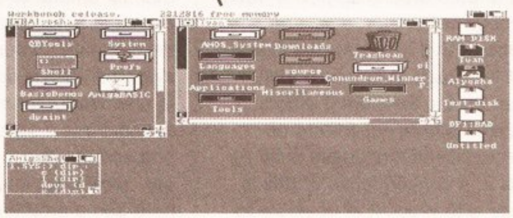




Also on its own screen is a Mandelbrot generator. It's calculation intensive, and tends to slow the Amiga down



The ***Pen Pal*** **word processor is all ready to print. Once print is selected, the Preferences print program will be engaged, and the user can get on with doing something else**



The Workbench screen. Several programs can run simultaneously in windows on this screen. Programs can also run in their own screens, with different colours and resolutions. Swapping screens is achieved by clicking on the gadget at the top right of the screen's title bar. Screens can be dragged up and down with this bar to reveal others beneath

spreadsheet package and continue work on your accounts.

Making use of multitasking can often save you lots of time. There was an occasion when I had to low-level format my hard disk. Now this takes well over an hour, and time was precious. So I set the format program away, and then got on with my work using *Protext*, saving occasionally to the RAM disk. By the time the disk was formatted I had a

An adequate amount of memory is even more important. Bearing in mind that all of the programs running at any one time must be present in memory, a standard Amiga doesn't really have space for more than a couple of decent sized applications. Unix, an operating system popular on mini computers, gets around this problem by use of a strategy known as virtual memory. This enables the computer to treat its hard disk as if it

the same program. In most cases, this would result in each copy taking hold of the chunk of memory it needs and acting completely independently of the other. There is an AmigaDOS command, however, which enables certain programs to be used several times although only one copy is present in memory. The command is 'resident'. More about this and other multi-tasking aspects of AmigaDOS next month. AS

Beginning with C

The first in a major series on the most popular programming language for the Amiga: C. Cliff Ramshaw kicks off with an introduction to C and a guide to installing it on your system...

If you want to make money from programming, C is the language to learn. Its popularity on the Amiga, and on other systems, is enormous. A quick glance through the job ads in Thursday's *Guardian* will show you how much in demand C programmers are.

Most of the work is on Unix systems, ranging from systems support to database creation, communications, code maintenance or real-time embedded systems design. There's also plenty of C coding going on in the PC world, and of course plenty of opportunities for writing applications for the Amiga. An experienced C programmer can expect to earn around £1500 a week as a freelancer.

None of this is to say that C is a perfect language. It has received criticism for the freedom it allows programmers from exponents of more specialised languages such as Modula 2. A consequence of this is the ease with which it is possible to create programs with fatal errors; yet it is largely this freedom, and the brevity of the language, that has made C so popular.

MULTI-PURPOSE C

C is a a general purpose language. It was initially written for Unix, one of the first popular multi-user operating systems. Unix itself was subsequently re-written in C, as was the C compiler, giving the language a reputation for systems development. It was also used, however, to write the vast number of utility programs that come as standard with a Unix environment, and which may be likened to the commands that live in the c directory of the Workbench.

Following the development of Unix, C has been used to write much of the Amiga's operating system. Prior to version 2, some of it was written in BCPL (a predecessor of C), but for the latest version this has been re-coded in C. Similarly, many of the programs available commercially and in the public domain are written in C. It really is the Amiga's mother tongue.

Although a general purpose language, C is better suited to some applications than others. It has a reputation for speed, but it just isn't nippy enough for a full blown arcade-style game. Because C gives the programmer easy access to the nuts and bolts of the machine in a manner similar to assembler, it is an excellent language for systems development: writing operating systems, device drivers and so on. It is also useful for more high-level applications – spreadsheets, word processors, image processing – that are calculation intensive, although here some programmers may prefer Modula-2 or Cobol, since these offer more sophisticated data structure handling. C is superior to Basic in every respect save one: it is more difficult to understand.

As with most languages more sophisticated than assembler, C has claims to portability. A program that is portable is one that, working on one machine, can be transferred to a different machine and still work. If the machines use different processors, then the program will not work directly on both, since the computers will expect their programs to be written in different codes. Nevertheless, the program's source code (the text which the programmer has created) should be transferable

MAKING A NORTHC SYSTEM

Before you can begin your programming endeavours you need to have a decent systems disk with the compiler, linker and so on installed on it.

NorthC normally comes compressed on to one disk. It unpacks on to two – a simple process, since it comes with a program specially written to automate the task. Before you begin, you need to prepare two blank formatted disks, named NorthC and NorthC Examples. This can be done from the CLI or Shell with the following commands:

```
format drive df0: name "NorthC" noicons
format drive df0: name "NorthC Examples" noicons
```

Then change directory to that of the unpack command on the *NorthC* distribution disk. On my version (1.3), this is the directory "Distribute:NorthC 1.3". Enter the command 'unpack', and have your two new disks to hand. Follow the instructions which tell you when to insert the various disks as the files are de-archived.

What you do from here on depends on the kind of set-up you have. If you have a hard disk, then life will be much easier. Using the Shell or CLI, copy all of the files in the *NorthC* 'bin' directory into the 'utilities' directory of your system disk. Make a directory called 'include' on your system disk and copy the contents of the *NorthC* 'include' directory into it. Next make a directory called 'clibs' on your system disk and copy everything in the 'clibs' directory of the *NorthC* disk into it. Finally, copy an editor into your utilities drawer. I recommend *Memacs*, which can be found in the 'tools' directory of the Extras disk.

If you are working with floppy drives, then your best bet is to make a bootable disk with the compiler on it and the minimum of the Workbench disk necessary to aid you in development. This way you can keep your own programs on a separate disk or in the RAM disk, and have all of the necessary compiler files in one place.

To do this first of all make a copy of your Workbench disk:

```
diskcopy from df0: to df0:
```

Swapping between your Workbench disk and new disk as requested. Now rename the new disk:

```
relabel ?
```

At the prompt, insert your new disk into df0:. Then type:

```
df0: NCBoot
```

The next step is to make as much room as possible on the disk by deleting all of the unecessary files on it. Use the 'delete' command in conjunction with the following filenames and wildcards (ways of specifying more than one file at once):

```
NCBoot:c/fault
NCBoot:c/install
NCBoot:c/ed
NCBoot:c/edit
NCBoot:c/diskchange
NCBoot:c/newcli
NCBoot:c/diskdoctor
NCBoot:#?.info
NCBoot:devs/narrator.device
NCBoot:l/speak-handler
NCBoot:prefs/#?.info
NCBoot:prefs/preferences
NCBoot:system/#?.info
NCBoot:l/fastfilesystem
NCBoot:Trashcan
NCBoot:Shell
NCBoot:Empty/#?
NCBoot:Empty
NCBootExpansion/#?
NCBoot:Expansion
NCBoot:utilities/#?
NCBoot:libs/mathieeedoub#?
NCBoot:libs/translator.library
NCBoot:fonts/ruby/#?
```

```
NCBoot:fonts/ruby
NCBoot:fonts/ruby.font
NCBoot:fonts/diamond/#?
NCBoot:fonts/diamond
NCBoot:fonts/diamond.font
NCBoot:fonts/opal/#?
NCBoot:fonts/opal
NCBoot:fonts/opal.font
NCBoot:fonts/sapphire/#?
NCBoot:fonts/sapphire
NCBoot:fonts/sapphire.font
NCBoot:fonts/garnet/#?
NCBoot:fonts/garnet
NCBoot:fonts/garnet.font
```

Workbench 2 users will find that they don't have some of these files on their disk. To make room, they must also delete the following:

```
NCBoot:prefs/wbpattern
NCBoot:prefs/overscan
NCBoot:prefs/palette
NCBoot:prefs/screenmode
NCBoot:prefs/time
NCBoot:libs/rexxsupport.library
NCBoot:libs/mathieeesingtrans.library
NCBoot:libs/rexxsyslib.library
NCBoot:rexxc/#?
NCBoot:rexxc
NCBoot:system/rexxmast
NCBoot:c/magtape
```

Now it's time to copy the relevant files from the *NorthC* disk on to your newly created NCBoot disk:

```
copy NorthC:bin/NorthC NCBoot:utilities
copy NorthC:bin/A68K NCBoot:utilities
copy NorthC:bin/Blink NCBoot:utilities
copy NorthC:bin/cc NCBoot:utilities
```

The editor *Memacs* must also be copied into the utilities directory. Exactly how it is done will depend on the version of Workbench you are using. This works for version 1.3:

```
copy "Extras 1.3:tools/memacs' NCBoot:utilities
```

Now to make directories for the include files and library files, and copy the stuff into them:

```
makedir NCBoot:include
copy NorthC:include/#? NCBoot:include
makedir NCBoot:clibs
copy NorthC:clibs/libc.a NCBoot:clibs
copy NorthC:clibs/crt0.o NCBoot:clibs
```

Modify the startup-sequence so that the compiler knows where to find its include files and libraries. Use an editor such as *Memacs* and modify the disk's startup-sequence (held in the s directory) so that the final lines read as follows:

```
;LoadWB delay
cd NCBoot:
assign clibs: NCBoot:clibs
setenv INCLUDE NCBoot:include
newshell "newcon:0/10/640/246/NorthC"
endcli >nil:
```

Workbench 2 users should replace the 'newshell' line with:

```
newshell "con:0/10/640/246/NorthC"
```

The final step is to make the disk bootable:

```
install ?
```

Insert the NCBoot into df0:, type 'df0:' and hit [Return]. Once the disk has stopped whirring, you're ready to reboot with your newly made development disk.

to the second machine and then be capable of recompilation. This recompiled program should then run without hassle.

Similar claims have been made for Basic, but there are so many versions that converting even a simple program from one machine to another involves a lot of re-writing. C, on the other hand, is standardised across all platforms. This is achieved by keeping the language small – C has surprisingly few keywords.

You may be wondering how it can provide control over operating system commands, graphics, windows and so on across all machines, even those that don't have high resolution graphics or windows support? In fact C neatly side-steps the problem by not providing support for any of these things. Nor does it provide facilities for printing text to the screen, or even for dealing with strings of characters.

IN SUPPORT OF C

All of these functions are provided by a system of libraries. Each of these libraries holds a set of related functions, any one of which may be called from a user's program. The idea is that the compiler manufacturer will supply a set of libraries with its compiler for a particular machine. The actual code of the libraries themselves will vary depending on which machine they are written for, but they will provide the same functions as the libraries written for another machine. In this way, a user's program can make use of the libraries without worrying what type of machine it is running on. A program which calls the print function on the Amiga will access a library which delves deep into the Amiga's operating system; but the same program could be transferred to the IBM PC and re-compiled, where instead it would make use of a library which got to grips with the PC's operating system and library.

This approach is all very well for simple text input and output, string handling and so forth, but it tends to fall down when more complex operations such as graphics are required. Because different machines use different graphics formats, it is near impossible to create libraries sufficiently generalised to deal with all of them. So C compilers tend to come with two sets of libraries: the standard C ones, dealing with text input and output, strings and so forth, and machine-specific ones to cater for the more complex operations.

What this means is that any but the simplest C programs will not be portable. Transferring an Amiga program which makes use of the blitter to the PC will cause problems, as the PC doesn't have a blitter. Ah, so the ideal of portability is an unattainable one, you may think, but this isn't entirely the case.

The compromise involves the idea of modularity. Just as the C libraries are divided into general and machine-specific areas, so should your programs be split. The parts that deal with graphics, sound and so forth should be kept as separate as possible from the parts that manipulate data, perform logical decisions and so forth. The result is that if you come to implement the same program on a different machine, you can easily find and change the machine specific sections. Otherwise, you could be searching through a whole mass of code looking for those incompatible function calls.

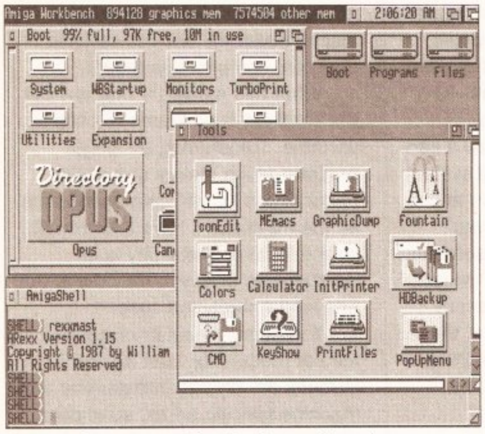
The C language itself is entirely portable, and since this series aims to explain C programming, most of the advice it gives will be applicable to C on any machine; it won't be until much later that we start to discuss the complex ideas of dealing with the Amiga's special functions. This means that what you learn here will be valuable on any platform. Become proficient in C and you become a valuable commodity in the programming world. Not only are you ready to write Amiga applications, but you're not far from entering the lucrative market for C programmers on the PC and Unix systems. Following this series, you should find it not only enjoyable and educational, but hopefully profitable too. AS

CHOOSING A COMPILER

There is quite a number of C compilers for the Amiga. The package most professionals choose is *SAS/Lattice C*, available for £229 from HiSoft ☎ 0525 718181. This is a lot of money for a language that you are as yet unfamiliar with, and which you are not sure is the one for you. Far safer, then, to try something from the public domain. We recommend *NorthC*, a package which includes a linker, assembler and numerous examples. It's on PDOM disk 211. We got our copy from Public Dominator which can be contacted on ☎ 0279 757692. *NorthC* is now a charityware product. A lot of work has gone into it; and we urge you to send £15 to the Spastics Society as the author Steve Hawtin requests.

AREXX for all

If you've recently bought an Amiga or have upgraded your existing machine to Workbench 2.04, no doubt you've already heard of ARexx. But what is it and what are its capabilities? And why are the techies getting so excited about it? There's no doubting that ARexx is important – after all, just flick through the pages of magazines such as *Amiga Shopper* and you'll see ARexx referred to over and over again, usually accompanied by words of praise. You may even have bought a software package which boasts ARexx compatibility on its packaging. But why are software vendors flocking to support an aspect of Workbench 2.04 that Commodore virtually ignores in the Workbench manual?

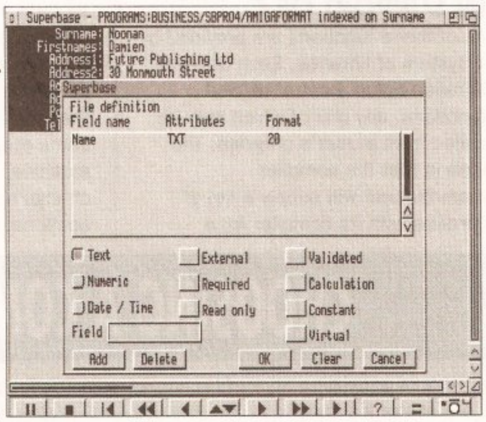


Commodore may virtually ignore it within the Workbench manuals, but ARexx is one of the most powerful aspects of Workbench 2.04

These are just a few of the many questions which we'll be exploring over the duration of this series.

Before we can answer these questions though, it's important to understand precisely what ARexx is and what it is capable of. Sure, it's a programming language just like C or BASIC, but its power and flexibility are so great that it goes so much further than this. At its most basic level, ARexx has primarily three uses – as a programming language for writing stand-alone scripts (programs), as a macro language for controlling the operations of existing software and as a mediator between applications.

Let's take a look at these three applications in a little more detail.



ARexx can be used as a macro language to automate common functions within packages as diverse as paint programs, page layout systems, databases, word processors and spreadsheets

PROGRAMMING

The basic ARexx command set is a bit of a hybrid between AmigaDOS and more conventional languages such as C and BASIC. As a result, ARexx can be used to create anything from a simple AmigaDOS-like script file to manipulate a set of files to full blown applications such as databases etc. In many ways, you'll find ARexx preferable to other languages because ARexx scripts are often shorter and easier to write than a similar program written in a conventional programming language.

The core commands of ARexx are quite powerful and are ideally suited to manipulating information in many different forms. The command set includes copy strings, strip leading characters from a string, extract substrings from strings (a bit like the MID$ command in BASIC), extract individual words from within a string, evaluate a string, generate a random number and much more besides. ARexx also includes all the sort of program control constructs that you'd expect from a modern programming language.

> **"ARexx can be used to create anything from simple scripts to full blown applications"**

MACROS

One of the most powerful aspects of ARexx is its ability to talk to other applications running under the Amiga's multitasking environment via an ARexx 'port'. Although software applications have to be specifically written to support ARexx (this therefore rules out most pre-Workbench 2.04 software), developers are flocking to support ARexx simply because it provides a standardised way of controlling their software products externally.

Say, for example, you wanted to convert a series of ray-traced frames stored in 24-bit format to HAM mode so that they could be displayed on a standard Amiga using a package such as ASDG's *Art Department Pro*. If you were to do this manually, it would not only be rather time consuming, but also rather boring. Because *ADPro* supports ARexx, you could automate this task by writing a simple ARexx script that tells *ADPro*

THE AREXX SYSTEM

The core of ARexx consists of a couple of very small files on the standard Workbench 2.04 distribution disks. Among those included, there are basically three files that must be present to get ARexx programs up and running. All the ARexx command line programs can be found within a directory on your boot disk called 'REXX:'.

• **RexxMast** – Within the current release of Workbench (2.04), ARexx isn't actually part of the firmware so it is necessary to install it before it can be utilised.

This isn't as complicated as it sounds – providing that all the correct files are accessible, all you need to do is either run the RexxMast program manually or just add a line to your StartUp-Sequence so that it runs when the machine is booted up. ARexx doesn't stay resident when the machine is reset though, so it's much easier and less hassle to use the second option. RexxMast simply installs the ARexx command server so that it runs in the background.

• **RexxSysLib.library** – This disk-based library must reside in the LIBS: directory of your boot disk when the RexxMast program is run. This library contains all the core instructions and functions of the ARexx language. Because it is a shared library, several ARexx scripts can access it simultaneously.

• **RX** – Finally we have RX, a small Shell-based program that is used to execute your ARexx scripts.

The RX program can also be used to execute ARexx statements directly from the command line or from within an AmigaDOS script. If RX is passed a filename, it will attempt to run an ARexx script of that name.

Don't be too concerned about the other ARexx commands within the Rexx directory.

We'll be covering these commands in some depth in a future issue, but in the meantime here's a quick rundown of what they do.

• **HI** – If things start to get a bit out of hand, the HI command can be used to halt all active scripts immediately.

• **RXC** – Closes down and kills the ARexx system if it is currently running.

• **TS** – Turns on ARexx trace mode.

• **TE** – Turns off ARexx trace mode.

• **TCO** – Opens up an ARexx 'global tracing console'.

• **TCC** – Closes the global tracing console opened with the TCO command.

• **RXSET** – Sets a global 'clip' variable.

• **RXLIB** – Adds an ARexx function library to the system or displays a list of the currently accessible ARexx libraries installed.

• **WaitForPort** – Instructs the system to wait for a message to be received from a given ARexx host (port).

In the first of a regular series, Jason Holborn reveals the wonders of ARexx, possibly one of the most powerful aspects of Workbench 2.0

what to do. You could then leave the Amiga running whilst it performed this task for you, leaving you to catch up on the latest happenings in Summer Bay or Ramsey Street.

ARexx doesn't just automate applications, it can also be used to extend applications by creating new 'super facilities' from an application's existing list of facilities. Say, for example, you needed to perform an operation on a spreadsheet that involved several distinct steps.

Instead of having to carry out each step in turn, you could write an ARexx script that joined all these individual operations into one, effectively adding a new function to the spreadsheet. As you can probably already start to appreciate, this sort of automation will not only speed up your work, but will also make the spreadsheet more powerful as several individual operations can be performed at once.

TASK MEDIATOR

As an extension to ARexx's ability to automate an application, it's also perfectly possible to use ARexx as a mediator between two (or more) previously incompatible applications. ARexx effectively sits between the two applications and passes messages between them.

> **"... ARexx scripts are often easier to write than similar programs written in a conventional programming language..."**

The best way to demonstrate this concept is by using a common example. Say, for example, you wanted to pull together an animation consisting of a series of ray traced frames but the package that you were using to generate these frames was not capable of creating animations itself. To get around this, you could use a second package that takes the output from your ray tracing program and pulls them together into an ANIM-format file. Now, this would usually involve a lot of work, but it's child's play to ARexx.

Providing that both packages support ARexx, you could write a script that first instructs the ray tracing package to load in a scene, generate the ray traced image and then save it off to disk. The script could then modify the scene (move the viewpoint, for example) and then instruct the ray tracer to render this scene and save it off to disk. The process would then continue automatically until all the frames were complete. Once this situation arose, the script would then instruct the animation program to pull in each frame one by one and then save out the resulting animation in ANIM-format.

OK, this is not a perfect example of ARexx in action, but it does demonstrate how operations that usually require user interaction can be automated. If you were trying to construct a particularly complex animation using 24-bit images, you could easily leave ARexx to do the job for you whilst you slept. In the morning you would (hopefully) find the final animation on your hard disk waiting to be displayed. Indeed, the only thing ARexx won't do is turn off the Amiga once its job is done!

MULTIMEDIA AND AREXX

ARexx's ability to control applications is by far the most powerful aspect of the language. Applications too can take advantage of this. Take a multimedia authoring system, for example. Simply by coding a couple of ARexx scripts into the authoring system, you can extend its power immeasurably. If there's something that the authoring system can't do but you have a package that can do the job, the authoring system can 'sub-contract' the application to do the job for it, passing the results back once they're complete.

```
CED File: ADProComm.rexx                    I    line 15    col 17
/*
   ADPro Communications script
*/
arguments = getclip(ppuser_adargs)
if args = '' then exit
parse var arguments iwidth ';' iheight ';' rendermode ';' filename ';' mode

adstart = 0

early = 1

do 10

   if ~show(p, 'ADPro') then
      call delay(100)
   else
   do
      adstart = 1
      leave
   end
   early = 0
end

if ~adstart then
do
   call setclip(ppuser_adclip, "0")
   exit_msg()
end

call setclip(ppuser_adclip, "1")
```

Don't worry if ARexx programs are meaningless to you – stick with us over the coming months and you'll be churning out ARexx scripts with the best of 'em

GIMME MORE POWER

Another very important (and quite exciting) aspect of ARexx is its expandability.

Considering the kind of high power applications to which ARexx is suited that we've already discussed, you might actually be surprised to learn that the ARexx language itself is very simple indeed. This shouldn't be considered a downfall though – in fact, it is probably ARexx's ace card.

Because ARexx is based around a 'shared library' (that is, all its commands must be pulled in from a disk-based library file), it's very easy indeed to extend the language beyond recognition. There's already a wealth of add-on libraries for ARexx available in the Amiga PD libraries which enable you to code ARexx scripts to open windows, display requesters, perform database operations and even access Amiga ROM kernel routines. With this sort of support available, there's no reason why ARexx couldn't be used to code absolutely any application.

PURSUIT OF PERFECTION

Of course ARexx isn't perfect (although it's getting there). Because ARexx is an interpreted language, it's nowhere near as fast as languages such as C or assembler, so it wouldn't really be possible to code arcade games or any application which requires high speed calculations or data capture (sound sampling, for example). Then again, tasks such as data capture need only be handled by an ARexx library that passes the address of the captured data back to ARexx.

As you see, ARexx is so flexible that there's always a way of getting around its self imposed limitations. AS

IN THE NOT SO DISTANT PAST

ARexx (or simply 'Rexx' as the original was known) was developed by a very clever chap called Mike Cowlishaw at IBM. Developed as a language that (in Cowlishaw's own words) was "designed for people, not machines", Rexx became an integral part of the CMS (Conversational Monitor System) user interface for IBM mainframes. Rexx enabled programmers and users alike to produce applications quickly and easily without the kind of mysterious error messages and unfathomable syntax that most programmers had become used to.

Rexx made its way on to the Amiga in 1987 thanks to William Hawes, the author of a number of PD and commercial Amiga titles including *ConMan* and *WShell*. The Amiga's multitasking operating system was perfect for Rexx since any application running under this environment could be treated as a 'host', enabling ARexx programmers to link applications together so that one application could control another and laborious tasks involving a number of different applications could be automated.

Although ARexx has been floating around since 1987, support has been slow to arrive. Indeed, it is only with the recent general release of Workbench 2.04 that it has really started to gain the sort of acceptance that it truly deserves. Sure, developers embraced it with open arms simply because it suited their needs so well, but it remained a mystery to the rest of us for many years. Now that Workbench 2.04 has become the defacto standard though, I can guarantee you that you'll be hearing a lot more about ARexx.

NEXT MONTH • NEXT MONTH • NEXT MONTH

Next month we'll be taking the first steps towards programming in ARexx. I'll show you how to print text on the screen, get an input from the user and much more besides. The wait will be unbearable, but I can guarantee you that it'll be worth it! Stay tuned.

Cracking the shell

In the first part of an ARexx special, Mark Smiddy explains how to add a completely new AmigaDOS command to your system...

Life, they say, is full of change; and with every change comes a transition (often painful) between the old and the new. Take AmigaDOS for instance – when Commodore revised and improved the whole system, a lot of stuff went out and a lot of new things were introduced. However, for various reasons many people have bridged the gap by fitting two Kickstart ROMs to their machines. One boots AmigaDOS 1.3, the other boots AmigaDOS 2 – but the two systems suffer from vast downward incompatibility – not to mention a few bugs.

LISTING 1 • LISTING 1 • LISTING 1

Eclectic Startup-sequence (revised)

```
1. ISTOO
2. if warn
3. C_1.3/ASSIGN C: SYS:C_1.3
4. C:ASSIGN S: SYS:S_1.3
5. C:ASSIGN DEVS: DEVS_1.3
6. C:ASSIGN LIBS: LIBS_1.3
7. C:ASSIGN L: L_1.3
8. execute S:Startup-sequence
9. endif
10. ;The Workbench 2.04 startup continues here
```

OOPS...

The Eclectic startup-sequence (*Amiga Shopper* issue 16) was supposed to get around this problem – but as with most things Amiga, the situation became more confused than had first appeared. The idea was to check for a resident version of ECHO (only found from AmigaDOS 2) and select the appropriate Workbench automatically. Although the listing shown worked on the test machine, it did not work on many others – the main reason being a change to one of the commands. Here are the offending lines:

```
1. which >RAM:temp ECHO
2. search >NIL: RAM:temp ↵
"RESIDENT"
```

Under some versions of 1.3, the RAM disk is not reliable at this stage – so the program could be revised:

```
1. which SYS:T/temp ECHO
2. search SYS:T/temp
"RESIDENT"
```

However, as some of you might have already noticed this is not the main source of trouble. Under Workbench 1.3, WHICH returns "RESIDENT xxxxx" and under 2.0x it returns "INTERNAL xxxx". Although this may sound trivial, it makes all the difference since the program relies upon that fact. In practice, the 1.3 Workbench would always be selected and the test machine would always be running the wrong version of WHICH in its 2.04 C directory. This was my fault, and in recompense, here is a new AmigaDOS command which does work.

When I say a command I mean just that – a tiny assembly language program which will fix that annoying ROM switch problem once and for all. Now I know many people get completely turned off by the thought of "machine code" and complain they haven't got an assembler – so I have provided some extra goodies to avoid all the pain. The extras are conversion programs written in ARexx (bundled with Workbench 2) to convert a hexadecimal dump of the program's binary into a real AmigaDOS program. They will find other uses though. Since this is a two part feature, I'll be discussing those extra features later.

In order to use the Eclectic startup-sequence, you must configure your hard disk with the correct directories and directory names (see *Amiga Shopper* 16 for details of how to do this). The revised startup is shown in Listing 1. All the hard work is done at Step 1. The program ISTOO (which should be present in the boot path or C:) returns a WARN condition if the machine is running Kickstart 1.3 and clear if it has 2.04 or higher. This allows the startup to make the appropriate assignments and boot the correct version of Workbench. The name incidentally, was coined after listening to an argument between two five-year-olds: "It's not yours" "Is too" "Tis not" and so on.

Unless you have access to CIX (where the program is available for download in the *Amiga Shopper* conference) you will have to enter ISTOO yourself. If you already have an assembler, the program can be assembled directly from that. The prototype was developed using HiSoft *Devpac 3*, but just about any assembler including *Cape 68K*, *ArgAsm* and *K-Seka* should do the trick. The version listed here includes the LVOs and does not require the usual header files.

If you don't have an assembler, you can use the ARexx HEX2BIN (hex compiler) to generate the command from the hex dump supplied. All you have to do is enter ISTOO.HEX in your favourite text editor and compile it with the ARexx program supplied. Assuming you have placed the hex code in S:, the command would look something like this:

```
1>RX HEX2BIN S:HexDump ↵
C:ISTOO
```

HOW IT WORKS:

ISTOO.S

As my Editor would say, this is not a machine code tutorial – so this explanation will only touch the surface of what this program does. Even if you have never touched an

JARGON BUSTING • JARGON BUSTING

AmigaDOS – The most basic part of the Amiga's operating system – the collection of programs which take care of the general running of the machine. AmigaDOS concerns itself with device-handling: control of the keyboard, basic screen output, disk drives, printers and so on.

Startup-sequence – A program which is executed every time the Amiga is switched on and after every reset. It sets up the system so that it is usable by the Workbench, and may be customised by those who have unusual hardware or software requirements.

LISTING 2 • LISTING 2 • LISTING 2

ISTOO.S

```
1.          lea      dosname(pc),a1
2.          moveq    #37,d0      ; V37 dos = V2.04 ROMS
3.          move.l   4,a6        ; get EXEC base
4.          jsr      -552(a6)    ; call OpenLibrary
5.          tst.l    d0          ; version 37 opened?
6.          bne.s    IsToo       ; yes!
7.          moveq    #5,d0       ; set DOS WARN
8.          rts                  ; return to DOS
9. IsToo     move.l   d0,a1       ; DOS base to A1
10.         move.l   4,a6        ; get EXEC base
11.         jsr      -414(a6)    ; call CloseLibrary
12.         moveq    #0,d0       ; Return normal exit
13.         rts                  ; return to DOS
14. dosname dc.b     "dos.library",0
```

assembler, you might want to read this description for more information. For the technically minded, it is re-entrant and re-executable (pure) so you could make it resident if you really wanted to do so. For safety, it does not make any assumptions about anything – hackers would have a good laugh at this strategy – but it works. Line numbers are for reference – they must not be entered.

1. Stores the address (relative to where the program has loaded in RAM) of an ASCII string defined at Step 14 in A1. This is the name "dos.library" and it must be in lower case or the program will not work; this Kickstart "feature" can lead to some annoying bugs.

2. Stores the value 37 in D0. This is the internal version number of the DOS library as returned by VERSION – not the Kickstart version number. If you are using ZKick and loading a ROM image into RAM, you might need to revise this to 36 – you can check this using:

```
1>VERSION dos.library
```

while you have Workbench 2 and Kickstart 2 loaded. You only need to be concerned with the numbers left of the decimal point.

3. Copies the value held at address 4 into A6. This is called EXEC base and is the only absolute value in the entire system. Although its contents are liable to change, its position is not.

4. Adds -552 to the value held in A6 and jumps to that address as a subroutine. This is the entry point for the EXEC call, OpenLibrary, and this step asks EXEC to open the library whose name is pointed to by A1 of version D0. In other words, dos.library V37.

5. Step 4 always returns either "0" if the library opened or the address of the library base. This command sets a flag (a bit like the WARN flag in AmigaDOS) according to the contents of the return.

6. This command branches to Step 9 if the library opened correctly (a non-zero value was returned and found by Step 5). If not, it continues at Step 7.

7. Since the library version 37 did not open, this command places 5 (WARN) in D0...

8. ...and returns to AmigaDOS.

9. The program gets here if the library did open and to be nice and clean, it should be closed before the program completes. (This isn't absolutely necessary for such a tiny program – but I believe in playing by the rules). To close the library, its pointer is copied from the return register D0 to A1...

10. EXEC base is copied back into A6. Again, not really necessary since A6 should already contain EXEC base, but this code is generated by the *Devpac* macros and only takes microseconds.

11. Closes the dos.library for this task. Strictly speaking, dos.library is never closed, the program just gives back the rights to use it. See Step 4 for more information; -414 is the LVO for EXEC CloseLibrary.

12-13. Returns the all clear, EXIT OK to AmigaDOS.

HOW IT WORKS:

Hex2Bin

Hex2Bin is an ARexx script – which is not AmigaDOS. However, ARexx and AmigaDOS are very closely related – much more so than AmigaDOS and AmigaBASIC. You can think of ARexx as an extension to the already powerful AmigaDOS scripting language and I will be including more of these in the coming months when the need arises. ARexx scripts are usually stored in the S: directory too. For direct comparison, let's assume you had made EX an alias for EXECUTE. Running an ARexx script and an AmigaDOS script looks almost identical:

```
1>EX Hex2Bin Istoo.HEX IsToo
1>RX Hex2Bin Istoo.HEX IsToo
```

The ARexx master process must be running first of course. You can usually accomplish this simply by placing it in your User-Startup file on Workbench 2. (Workbench 1.3 users can also use these programs by obtaining ARexx as an extra or better still, by upgrading to Workbench 2). The reasons these programs were written in ARexx rather than the more usual AmigaDOS is two-fold: ARexx is better at the job and an ARexx version is much shorter! You should enter this program using a text editor like ED and save it in REXX: or S: under the name HEX2BIN.REXX – but enough of that, here's how it works:

1. All ARexx programs must start with a comment or ARexx will complain that it can't find the program. You can make the comment as long or short as you like but it must start with "/*" and end with "*/" just like C.

2. This command takes the command line arguments and stores them in the variable, "com". (ARexx does not have a front-end template parser like AmigaDOS's EXECUTE so the programmer must supply his or her own).

3. Sets the variable "infile" to the first word on the command line. This is the name of the input file to be converted, say RAM:IsToo.HEX.

4. This line does the same as Step 3, taking the second argument and storing it in Outfile. This is the name of the binary file to be created, say C:IsToo.

5. This just checks you have supplied at least the two required arguments. If you miss one argument off, it gets swallowed by the variable "Infile". If both arguments are missed, the same thing happens, the test is true and control continues at Step 6.

6. Warns of a bad argument template and provides help for the right one. If preferred you could use a two line script to let AmigaDOS handle this part (a better version will appear next month):

```
.KEY InFile/A,OutFile/A
RX Hex2Bin <InFile> <OutFile>
```

continued on page 94

LISTING 3 • LISTING 3 • LISTING 3

HEX2BIN.REXX

```
1. /*REXX Convert HEX to executable with checksum */
2. arg com
3. infile = word(com,1)
4. outfile = word(com,2)
5. if outfile == "" then do
6. say "Arguments not suitable for key - ↵
   RX HEX2BIN INFILE/a PROG/a"
7. exit 20
8. end
9. if ~exists(infile) then do
10. say "Fatal - source file" infile "not found."
11. exit 20
12. end
13. say "Converting: " infile "->" outfile
14. open('hexin',infile,'r')
15. open('prog',outfile,w)
16. sum = 0
17. line = 1
18. do while ~eof('hexin')
19. hexline=readln('hexin')
20. do X=1 to words(hexline)-1
21. long=word(hexline,X)
22. do Y=1 to 8 by 2
23. writech('prog',x2c(substr(long,Y,2)))
24. if substr(long,Y,2) = " " then do
25. say "Null (missing?) value in data"
26. exit 10
27. end
28. sum=sum + (x2d(substr(long,Y,2)))*(Y+X)
29. end
30. end
31. cksum=d2x(sum,4)
32. check=word(hexline,words(hexline))
33. if ~eof('hexin') then do
34. if check==cksum then do
35. say "line" line "correct"
36. line = line +1
37. end
38. else do
39. say "Fatal error in line" line "Check="check ↵
"Result="cksum
40. close ('prog')
41. close ('hexin')
42. exit
43. end
44. end
45. end
46. say line-1 "Lines compiled as " outfile
47. close ('prog')
48. close ('hexin')
```

continued from page 91

7. Closes the ARexx script with a failure error return.

8. Closes the IF construct opened at Step 5.

9. Checks for the presence of the input file.

This is directly equivalent to the AmigaDOS construct:

```
IF NOT EXISTS <infile>
```

in ARexx the tilde (~) is used to negate a test.

10. Displays an error message...

11. ...and quits the script.

12. Closes the IF construct opened at Step 9.

13. Assuming all has gone according to plan, this displays the opening progress message. Notice how in ARexx variables are assumed automatically? In AmigaDOS 2 this line could have read:

```
ECHO "Converting: $infile ↵
-> $outfile"
```

14. Opens the input file for read only. HEXIN (which must be enclosed in quotes) is a pseudonym used in ARexx instead of a decimal file handle found in other languages. This construct is much simpler to use and aids readability.

15. Performs the same operation as Step 14, only this time it opens an output file with the handle "PROG"

16. Sets an initial value for the variable SUM. It's probably worth mentioning at this point that ARexx has "typeless" variables – the sort of thing that makes programmers of most other languages balk. AmigaDOS uses a similar, if more crude system.

The idea is a variable can contain anything – text or numbers – and the interpreter decides which depending on the context in which those variables are used. As you will see later in this program, the same variables are treated as sentences (strings) and numbers; and ARexx's ability to do this easily makes the code much shorter than it might be in a conventional language.

Some would argue this makes code harder to understand, but I disagree.

ARexx is an everyman's language and anything it can do to make things simpler for the programmer is a good thing.

17. Initialises the line counter variable to its start value.

LISTING 4 • LISTING 4 • LISTING 4

ISTOO.HEX

```
1. 000003F3 00000000 00000001 00000000 07B4
2. 00000000 0000000D 000003E9 0000000D 11EA
3. 43FA0026 70252C79 00000004 4EAEFDD8 37A3
4. 4A806604 70054E75 22402C79 00000004 4CB1
5. 4EAEFE62 70004E75 646F732E 6C696272 7779
6. 61727900 000003F2 8570
```

18. Opens a DO...WHILE construct. This is a loop which will keep going until the end of the input file "HEXIN" is reached.

19. Reads one complete line of text from the input file, HEXIN into the variable "hexline".

20. Opens a DO loop which will loop once for each word in the "sentence" hexline. Typically this might look something like this:

```
000003F3 00000000 00000001
00000000 07B4
```

Each "word" in the line is actually several bytes of hex code. The first four words are the code itself, the last word is the checksum. The variable X – which starts at one – will be incremented by one after each complete loop.

21. The variable "long" is set to the word pointed to by position X. The choice of variable name reflects the fact four bytes (a longword) are being read from the string. On the first pass, using the previous example this variable would read:

```
000003F3
```

22. Opens another DO loop which will step the variable Y from one to eight adding two every complete loop: 1-3-5-7.

23. This line looks quite complex at first glance, but in fact it's quite simple. Put simply it converts one byte from the hexadecimal longword in "long" and writes it to the output file, PROG. Let's break it down into some bite-sized pieces:

```
1. HexByte=substr(long,Y,2)
2. Byte=x2c(HexByte)
3. writech('prog',Byte)
```

The first step takes two characters from the string in "long" starting at position Y. Using our previous example and assuming Y was one, HexByte contains "00". The second step converts the ASCII string "00" into a one-byte character equivalent – X2C is the ARexx function Hex to Character. Finally, at Step 3 this byte is written to the output file. You can see this part of the conversion in action by adding the following line between Step 23 and 24:

```
say="Byte to convert:" ↵
substr(long,Y,2)
```

24. This tests for a space somewhere in the data. (This sort of error is unlikely because it's quite easy to spot, but it will not be caught by the checksum algorithm.) If a space is found where a value should be, execution continues at Step 25 otherwise it jumps to Step 27.

25. Prints a simple error message...

26. ...and quits the script.

27. Closes the IF construct opened at Step 24.

28. Computes the current cumulative checksum. This line is quite complex at first glance so let's break this down:

```
1. Hex=substr(long,Y,2)
2. Byte=x2d(Hex)
3. Byte=Byte*(X+Y)
4. sum=sum + Byte
```

Step 1 is the same as before – it takes the HEX value of the byte at the current position in the string and Step 2 converts this into a number. Next the byte value is multiplied by the sum of the X and Y position in the file – this prevents byte transposition since the value generated depends on the position of the byte being read. Finally, that value is added to the cumulative checksum.

29. Closes the DO loop opened at 22. The value held in Y is incremented by two at this point and tested to see if it exceeds its preset value.

30. This line closes the DO loop opened at 20. X is incremented by one here and tested to see if it exceeds the limit.

31. Converts the checksum generated by the current line into a four byte hexadecimal value and stores it in "cksum".

32. Reads the last word from the current sentence held in "hexline". This value is a checksum generated by the conversion program listed in the second part of this article.

33. Tests the end of input file has not yet been reached. If it has control jumps to Step 45 otherwise it continues at Step 34.

34. Makes sure the checksum generated by the compiled code is the same as the original. If it is control continues at Step 35, if not (something has gone wrong) it jumps to Step 38.

35. Displays a progress message...

36. ...and increments the line counter.

37. Terminates the IF part of the IF construct opened at Step 34. Control now jumps to Step 44.

38. Control reaches here if the test at Step 34 fails...

39. ...and prints a useful status message...

40-42. ...before closing down neatly.

43. Terminates the ELSE DO block opened at Step 38.

44-45. Tidy up the remaining constructs.

46. Displays the closing message to say everything has gone according to plan...

47-48. ...and close the currently open files.

NEXT MONTH

In next month's Cracking the Shell, I'll be explaining how the hex code was generated and supplying four more useful commands for debugging scripts. AS

Gotta Problem John?

If you get stuck with AmigaDOS or there is anything specific you would like to see covered here, drop a line detailing your conundrum to: Mark Smiddy, Amiga Shopper, 30 Monmouth St, BATH, BA1 2BW. Sorry, no personal correspondence can be entered into. Desperate people, with no regard for telephone bills, can EMail me on CIX "SMIDOID".

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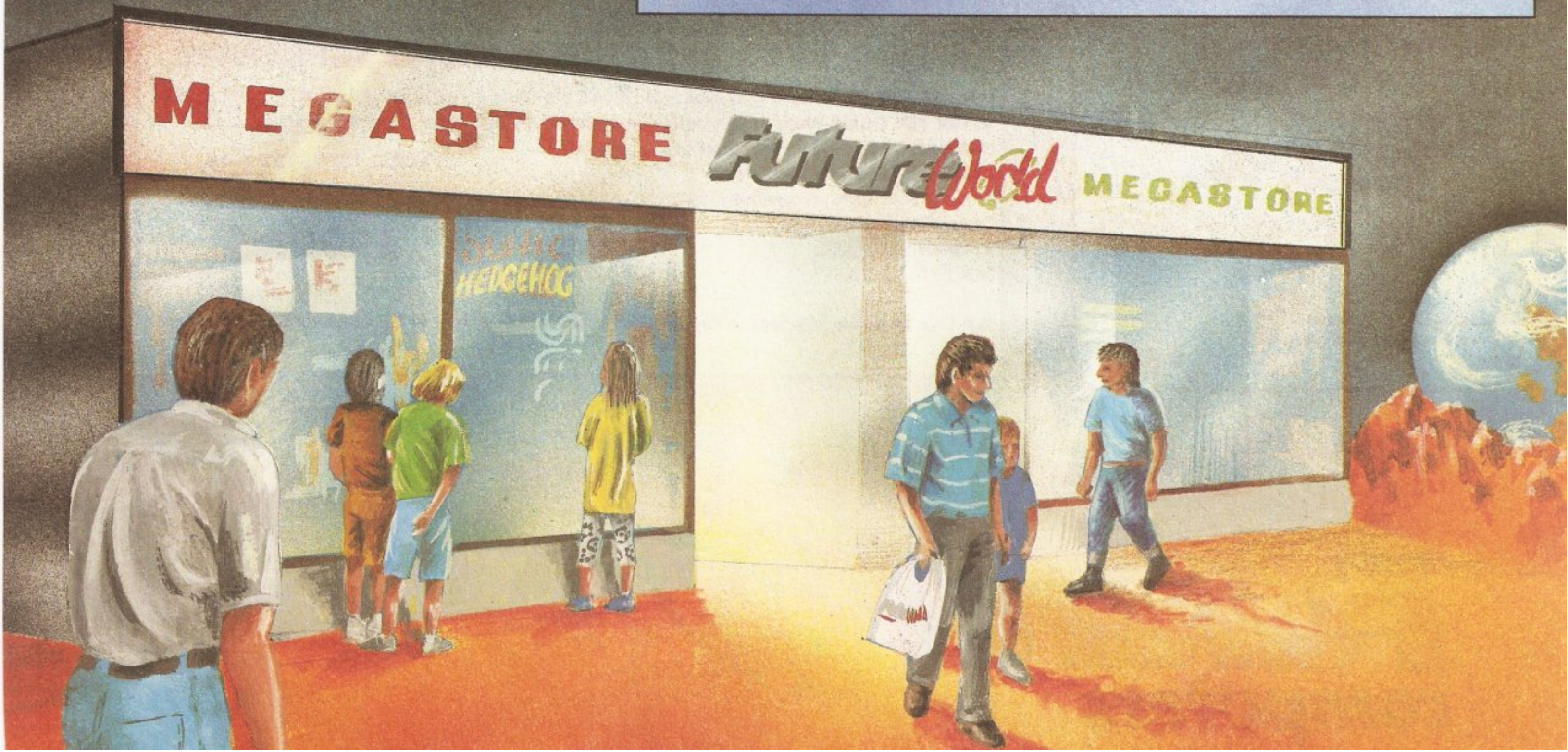
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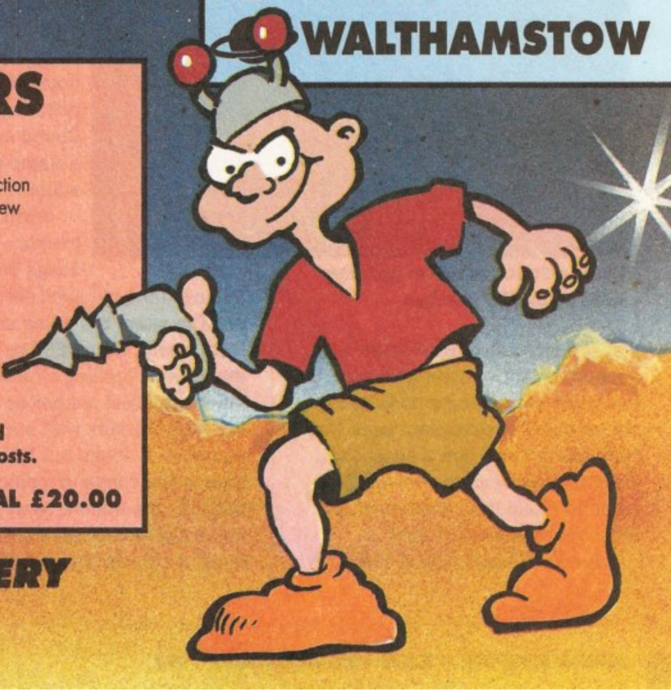
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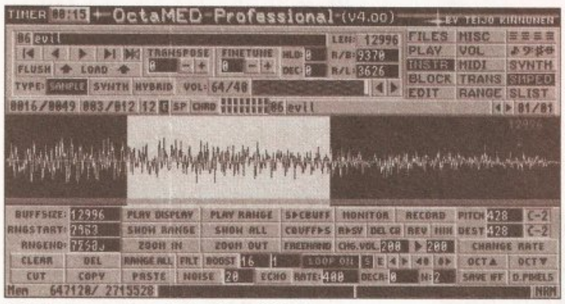
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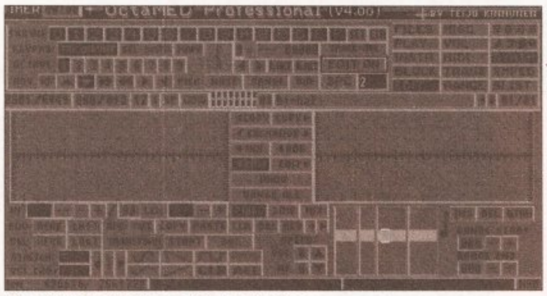
Tracking, that is composing and creating sample-based songs for playing via the Amiga's sound chips, is one of the oldest of the Amiga's music areas simply because, right from the start, programmers needed a fast, convenient way of creating music for games and demos. One of the earliest utilities to appear was called *SoundTracker* and within a few years a proliferation of these 'tracker' type clones had appeared.



In-built sample editing is a big plus for *OctaMED Pro*

Essentially programmers' tools, these utilities adopted programmer-like conventions for creating music sequences. Song descriptions tended to be built around lists showing the times and the pitches at which samples should be played. While not ideal from a musician's viewpoint this tracker method of composing music became established in Amiga circles and the race was on to create programs that were more powerful and user-friendly.

In 1989 Teijo Kinnenun released a program called *MED* (Music EDitor) which allowed songs to be created by defining small blocks of music which could be linked. Blocks could be arranged and repeated in any way, so, once the blocks had been defined, building the song became easy. In April 1990 a *MED* Version 2 was released which, among other things, provided a host of new editing facilities, a stand-alone song-player utility called *MEDPlayer*, and support for MIDI instruments. Up to this point these programs were PD but so much development work was being done that when a successor, *OctaMED*, arrived the decision was taken to make it a commercial (but reasonably priced) product.



The Synth Sound editor provides more *OctaMED* goodies

The good news now is that after more development the promised professional version, *OctaMED Pro*, has been released. Now *OctaMED Pro* has a lot of facilities and, because a few general *MED*-style tracking issues need to be discussed for the benefit of Amiga users who have never used one before, there isn't enough space to mention all of the enhancements. However, the following should give a good idea of what *OctaMED Pro* is capable of, and at the same time provide an introduction to the fascinating world of tracking.

AN OVERVIEW

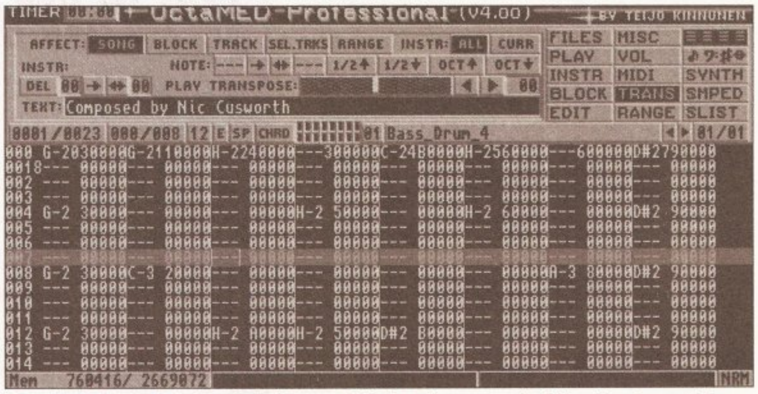
The first thing that strikes you about *Octamed Pro* is the improvement in screen display layouts, because the program has a Workbench 2 style look – and of course runs under both Workbench 1.3 and Workbench 2. There is also a much-improved file requester, options for input remapping, new BPM (beats per minute) timing options and a host of new MIDI and Player commands.

OctaMED Pro contains many different screens but two areas of the display are always visible: a status bar which shows current edit modes, block/instrument numbers or names, and mute/play track status; and in the top right of the display a fifteen-button menu panel. Ten of the buttons display other control panels for loading and saving songs and instruments, setting relative track volumes, transposition characteristics, MIDI settings and a variety of block/track and editing facilities.

The remaining five buttons switch between: a Block editor for entering note data in *MED* tracker format; a Graphic note editor, which lets you enter and display/print music a bar at a time using conventional notation; a Sample editor; a Synthetic Sound editor; and a Sample List editor.

If you have the memory, up to 99 songs can be held and even though such song sets need to share the same set of instruments *OctaMED Pro* can remap these when loading a new song. Most users will neither be able to, nor want to, work with such large numbers of songs but it is nice to have a few songs in memory because the editors allow copy and paste operations between songs and make it easy to re-use existing material. Compositions can be saved in a number of different formats: song files, files with song and instruments/samples, and modules containing multiple songs in a single file. Arrangements can also be saved in a *Sound/Noise/ProTracker* compatible form. *MED* started out as a four-channel tracker but *OctaMED Pro* provides splitting facilities which allow up to eight of the 16 tracks to be used with internal sounds (although sound quality suffers a bit when channels are split).

Four types of *OctaMED Pro* instruments are available. There are the conventional sampled sounds which are played back through the Amiga's audio channels – here IFF 8SVX and raw sample data can be used. Then there are the synthetic sounds which are special instruments constructed from pieces of waveforms whose pitch, vibrato, and arpeggio characteristics can be controlled by program instructions within a song. Third are 'Hybrid' sounds which are conventional samples controllable by program instructions. Finally *OctaMED Pro* supports the use of MIDI instruments and provides internal and external MIDI-clock sync facilities.



***OctaMED Pro*'s Block editor in use. This is where most of the block creation and song creation will be carried out**

Some useful MIDI facilities appeared with *OctaMED* and many new MIDI options have been added – as well as being able to use MIDI equipment as additional sources you can use an external keyboard to enter note data as you create songs.

OCTAMED PRO EDITORS

When the program starts up the lower half of the screen is occupied by the Block editor and this, for most users, is where the bulk of the block creation and song composition will be done. The basic tracker style of music entry hasn't changed although the display has improved since the early *MED* days and there is now an extra command digit available. The editor uses a spreadsheet-style two-dimensional grid of tracks and line numbers, where each line represents a 1/16th note (every fourth line therefore represents a quarter-note or crotchet within a bar). The number of tracks visible on the display can be altered from four to sixteen but Figure 1 gives the general idea of the layout used...

The data in Figure 1 are represented on the grid by a note description and a numerical entry. The example event shown (D#3 20437) actually provides this sort of information to *OctaMED*...

D note
#3 octave
2 voice
04 command (in this case speed and depth)
37 other data (in this case speed and depth)

Commands for things like volume control, creating arpeggios, slides, portamento, vibrato, hold and decay effects are provided for sampled sounds and there's a range of MIDI commands for setting controllers, sending pitchbend/modwheel and aftertouch messages and so on. The Block editor screenshot shows a real block description list. This approach is not too far removed from the track editing schemes used by MIDI sequencers such as Dr T's KCS.

One major difference is that these events control the playing of samples and so these event descriptions are not restricted to the playing of single notes. Suppose you want to create a repetitive drum part

This month Paul Overaa moves away from pure MIDI matters to talk about the New OctaMED Professional tracker program

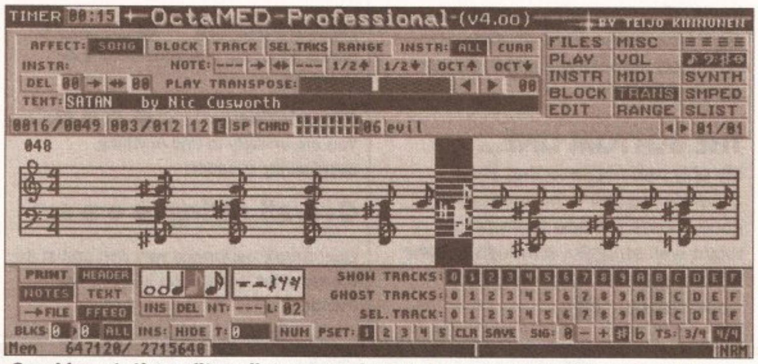
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containing bass drum, snare, open and closed hi-hats, and a couple of tom-toms. You could build it up using a number of tracks and perhaps even condense a good likeness of the finished part to a single track by eliminating a few of the drum beats that clashed. *OctaMED Pro* would still be doing a lot of work when playing that part and the seven drum sound samples would occupy a lot of space. An alternative is to program a MIDI drum machine to play the drum part and sample one bar of it. Nowadays most drum machines use high quality (16-bit) drum sounds. Sampling a pattern being played by a drum machine is a good way to get a decent drum track with the minimum of effort. The *OctaMED Pro* tracker programming for the drum track becomes ridiculously simple – only one single note and one voice (the sampled drum track) per bar is needed no matter how complex the original drum part.

You do have to take care with timing so the drum part synchronizes to the rest of the tracks. You can set the tempo of the drum part sample two ways: you can alter the *OctaMED Pro* event's note value (unlike other instruments small changes in pitch with drum sounds will not appear 'out of tune'); or you can remap the sample using the sample editor.

What then has to be done is to make sure that your one bar sample syncs with *OctaMED Pro*'s idea of a bar of music. Here it is a good idea to lay down a temporary straight-fours click track (using say a closed hi-hat voice), insert your one note per bar real sampled drum track, and adjust the program's playing tempo until the click track is in sync with your sample. Sampling one bar of music will produce a largish sample but it's unlikely to be as large as the space required for the individual drum samples. Another space/effort saver is to sample chords instead of notes because again this allows a chord backing track to be created by entering just single notes.

Such tricks allow a lot of information to be placed on a couple of tracks with the minimum of effort. Given that an *OctaMED Pro* block can have as many as 256 lines and 16 tracks this leaves a lot of track space for bass parts, melody lines etc, which can be entered more conventionally. Melodies can be added in real-time by selecting a suitable voice and 'playing along' with the existing tracks.



Graphic notation editor allows note data to be entered in conventional form

An alternative to the Block editor approach is the Graphic Notation editor which lets you enter, edit, play, and print music using stave notation. Having entered music in conventional note form you can switch to the block editor to add any special commands. In addition there is a Synthetic sound editor and the Sample editor. The latter is convenient because it allows you to remap sample frequencies and do all the usual types of ranged cutting/copying and paste editing without ever leaving the *OctaMED Pro* environment. You can also collect samples from any parallel-port sampling hardware. The Sample List editor is available for storing details of instrument names and locations.

Figure 1: A schematic layout of OctaMED Pro's block editing arrangements

←Lines→	← Tracks				→
	1	2	3	4	5 etc
001	D#3 20437				
002					
003					
004					
005					
-					
-					

OCTAMED PRO PLAYER

This is a stand-alone program which allows *OctaMED Pro* compositions to be played. If, for example, you create a single *OctaMED* song and save it using the 'Song+Samples' file format then you can play it from a CLI/Shell window just by typing...

```
OctaMEDPlayer <filename>
```

If you want it to run as a separate background process AmigaDOS's RUN command can be used like this

```
run OctaMEDPlayer <filename>
```

Insert this into a startup-sequence and you can kick off a piece of background music that plays while other programs are running. The player will run from the CLI/Shell or the WorkBench and can handle MIDI and *OctaMED*'s multiple song files as well as single songs. The new player cannot play existing *MED* songs but this is not a problem since earlier formats can be loaded into *OctaMED Pro* and re-saved in one of the new file formats. Among its other goodies the *OctaMED* player now has an ARexx interface.

If you have existing songs created by other trackers the Amiganut's AMFC (Amiga Music File Converter) utility is worth getting hold of because it automates music file conversion.

LAST WORDS

MED stood the test of time despite the limitations of early tracker programs. *OctaMED Pro* provides some major enhancements. *MED*-users will move to this with no problems and new users will find that life has never been easier. *OctaMED Pro* has good documentation on disk and there is now a printed user-guide. I would recommend it to anyone who needs a decent tracker.

SHOPPING LIST

OctaMED Professional........ £22.50
(includes disk documentation)
Upgrade from Version 2 ..... £12.50
Printed manual..................... £8.50
AMFC Music File Converter ... £5.00
All available from: Amiganuts United,
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☎ 010 800 722 2261

CHECKOUT OctaMED Pro

Ease of Use ●●●●○
Easy package to get to grips with.

Features ●●●●○
More facilities than the original *MED*.

Documentation ●●●○○
Much improved since early *MED* days – now has a very readable manual. Useful disk documentation is also still provided.

Price Value ●●●●○
Hard to beat.

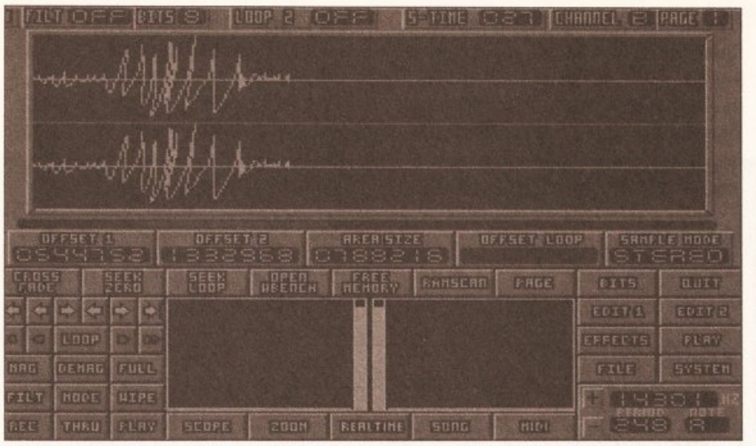
Overall rating ●●●●○

Despite the fact that it is no longer as cheap as the original *MED* program, *OctaMED Pro* is an excellent buy.

JARGON BUSTING • JARGON BUSTING

DMA – Stands for Direct Memory Access and it is a hardware technique that enables data transfers to and from memory to be made without direct involvement of the Amiga's main 68000 processor.

MIDI-Clocks – Special MIDI messages sent to provide timing information.



Beat Studio, pictured to the left, provides a perfectly adequate working environment for sample taking and editing

THE BEAT STUDIO

Paul Overaa takes a look at the new budget priced sampling package from City Beat...

***Beat Studio* is produced by City Beat and I've had it on my desk for a good couple of months now. In fact when I first opened the box and saw a flimsy manual, a disk and a small cartridge (all too obviously destined to be shoved into the Amiga's parallel port) I cringed because it looked like 'yet another' sound sampler. As it happens *Beat Studio* turns out to be a surprisingly good little package and one of the best new offerings I've seen for quite a while. Why? Because it is cheap, comes with some reasonable hardware and software, and most important of all – it does a perfectly adequate job.**

The sampling cartridge looks well constructed and, like most such hardware nowadays, it works well – you plug the unit into the parallel port and forget about it. The software side of the package provides mono/stereo and simulated stereo sampling and has signal metering and the usual range of cut/paste editing options, including loop and zero point location facilities. There are real-time effects (including inversion, phasing, echo and compression), and RAM-scanning is provided which allows the Amiga's memory to be searched for samples. Samples can be loaded and saved both in raw and IFF 8SVX formats.

JARGON BUSTING • JARGON BUSTING

Clipping – Caused by a signal being too strong for the input stages of a recording or sampling device. The input circuitry gets overloaded and the top parts of the incoming waveform get distorted or chopped off – the end result is a poor quality sound.

IFF 8SVX – This is the IFF (Interchange File Format) name of a file arrangement used for storing sound samples.

RAM Scanning – This means exactly what it says – programs which provide RAM scanning facilities allow you to scan through the Amiga's memory and, by 'playing' the data, look for sound samples.

Raw Sample – Basically a copy of the byte values of a sound sample just as they appear in memory (as opposed to a sample stored in a specially designed file structure such as IFF 8SVX).

Sampling with *Beat Studio* is straightforward. Set the sample size, click on THRU to monitor the sound and adjust the volume of the signal to just below the level where clipping occurs. When you hit the record button a prompt appears telling you that sampling will begin as soon as you click on the left-mouse button. The software, although not 'state of the art' in terms of Amiga sample editing, works as it should and provides all the basic functions that are necessary to do useful work.

BEAT STUDIO IN USE...

The key to good sampling is a good input signal, so it is best to sample directly from source rather than with a microphone – this ensures a clean, strong signal. With good quality leads, direct sampling, and good signal strengths *Beat Studio* produces surprisingly good results – simply excellent.

THE BOTTOM LINE...

My only real niggle is that *Beat Studio's* manual is not particularly good. Someone new to sampling might well struggle, although anyone who has used a sampler before would get by. AS

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BEAT STUDIO

Ease of Use ●●●○○
An easy package to get to grips with.

Features ●●●○○
Has all the basic facilities needed to get you into the world of Amiga sampling.

Documentation ●○○○○
Barely adequate and should really be improved.

Price Value ●●●●○
You are unlikely to find anything significantly cheaper.

Overall rating ●●●●○

Beat Studio performed very well and at its current price it deserves to win many friends.

BEGINNERS • BEGINNERS • BEGINNERS START HERE • BEGINNERS • BEGINNERS

SOUND SAMPLING...

A musical note is made up of sound waves that have a certain pitch (frequency) and a certain loudness (amplitude). When you hear a piece of music, what you are listening to is a mass of sound waves which include many different frequencies and amplitudes. The result, in most cases, is a very complex waveform.

Suppose you could 'freeze' the sound you were hearing and measure the amplitude of that part of the soundwave. Using some agreed convention you could then express that amplitude as a number. By repeating the process you would get a list of numbers, with each being the numerical equivalent of the original sound.

This is the idea behind sound sampling. By using special hardware which grabs and measures (digitises) that amplitude information many thousands of times a second it is possible to build up a very detailed digital copy of the original sound.

This opens up a whole new world because computers can then be used to carry out sophisticated editing, making it possible to achieve effects which are impossible with conventional analogue recording techniques. You can take pieces of one sound and mix them with another, speed up or slow down the rate at which a sample is played, or even shift the time-position of a sample before adding it back to itself in a modified form. As you would expect, the quality of the result depends on the accuracy of the digitisation process and here there are two variables to consider: sampling rate and the resolution of the numbers used to define the amplitude. Fast sampling rates give better waveform detail. You can also improve quality by increasing the range of numbers used to represent the amplitude measurements.

On the Amiga, amplitude digitisation is performed to an accuracy of 8 bits, so there are 256 possible values. This is sufficient for producing some excellent playback sounds with the Amiga's internal sound chips, but not as good as CD technology sampling (which uses 16-bit resolution). This has limited the interest in Amiga sampling for the more demanding applications but, for non-professional use, Amiga samplers have caught on in a big way. All Amiga sampling software makes use of the IFF 8SVX sample format, so sounds captured with one program can be loaded and used with any of the large number of IFF-based music programs available. Basically all you need to get into the world of sampling is some digitiser hardware and the software to control it – and most of the Amiga sampling packages include both.



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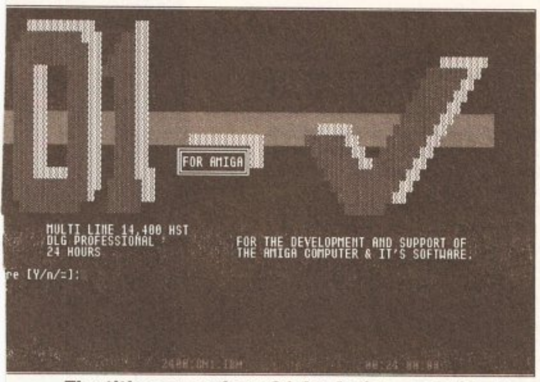
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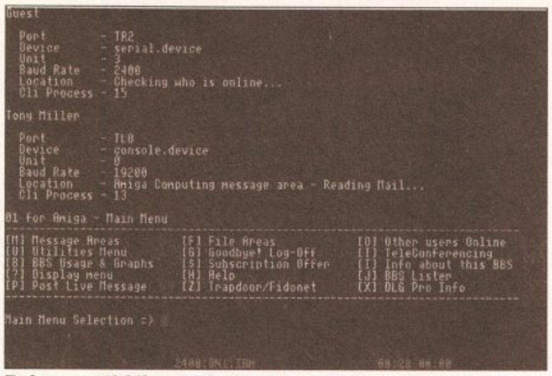
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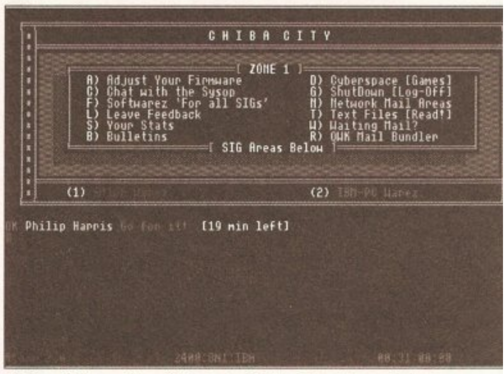
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The title screen from 01 for Amiga, probably the best Amiga BBS in the world



Being a multi-line BBS, 01 for Amiga lets you see who else is on-line. It's the expensive rate at the moment so it's just me and the sysop



Chiba City – the Cyberpunk feel begins at the main menu and continues throughout the board

Treading the boards

There are a host of bulletin boards all over Britain, many of which cover the Amiga to some extent, many exclusively. But finding out which ones you should visit can be very difficult. To help you, we've come up with three different boards for you to take a look at. All three offer something for the Amiga owner and are well worth a look for different reasons. Let's visit 01 for Amiga, Guru-10 and Chiba City.

First stop, a board a lot of people will have already heard of, 01 for Amiga.

01 FOR AMIGA

01 for Amiga (01 to its friends) has been around for no less than six years. It started life on an Amiga 500, running a system called *BBS-PC*. It has over 1500 members now and runs on an Amiga 3000 with some RAM and a hard drive, using the *Dialog Professional* BBS system. Recently a CD-ROM drive was added to the system.

The CD-ROM has facilitated the addition of *all* the Fish disks, yes all of them! There is also an on-line database which enables users to find any program on the disks and then download it. This is a superb service which makes it well worth subscribing to the system.

01 is one of the few Amiga boards to offer a subscription service. The subscription fee is purely optional and there are three grades, £5, £10 and £20 plus. Each of these three rates gives you different access times and upload/download ratios. The nice thing is that there is absolutely no pressure to subscribe, but if you do, the benefits are worth it.

Subscription also gives you access to a couple of subscribers-only lines which will prove to be very handy. 01 is a very popular board indeed. Although the board has several lines, these are very often engaged, so access to the other lines alone is worth a fiver, and access to the Fish collection can be invaluable.

01 also has a special "Guest" user option which enables you to take a look round the board without having to go through the quite lengthy registration process. This comes in very handy, and it would be nice if more boards used this idea. To visit the board as a guest, use a name of "guest" and a password of "guest" when you call the board.

FILES GALORE

But what do you get on the board itself? There are no less than sixty files areas including comms, *JRComm*, *NComm*, BBS software, printer related files, CLI utilities, Workbench utilities, editors, CanDo and AMOS, amongst others. There are also some more obscure areas, X-CAD and EMC Fonts to name but two.

Of course a board this big can't do without messages. There are 27 message areas, many of which are Fidonet echoes. These message areas include some more rare topics, such as Transamiga BBS echo, Welmat and ICPUG.

There are about 6,500 messages on the board which are constantly changing. With this much traffic you won't get anywhere without an off-line reader. As has been mentioned before, an off-line reader enables you to download unread messages from areas you are interested in and read them at a later date. This saves you money and enables you to participate fully in all the echoes you want. We'll be covering off-line readers in more detail in a future issue.

01 also features live teleconferencing facilities. This enables several people who are currently calling the board to enter a conference room and hold a real time conversation.

LET YOUR FINGERS DO THE WALKING...

I've had many requests for more BBS numbers, hopefully in the future we will be able to bring you a full list, but for now, here's a few UK boards you might like to try...

Chiba City	0501 44262
01 for Amiga	071 377 1358
Guru 10	0738 52063
Meridian Amiga BBS	0273 588924
Yukon Ho!	0232 768163
The Amiga Forgery	0908 604229
Protocol BBS	0403 272931
Theatre West End	0625 828795
Ponty BBS	0443 409882
061 developments UK	061 799 4922
Saxon	0273 308800
Cliffnet	0642 467324

If you give some of these a ring, there are bound to be others listed on those boards. Eventually you'll end up with a massive list, and a phone bill to match.

CONSIDER A CONFERENCE

Conferencing is a fun idea, but it really needs to be prearranged before it becomes interesting. For a conference to occur, several people have to be in the "conference room" at the same time – this seldom happens by accident.

It would be nice if 01 could arrange guest nights where special guests from the Amiga industry could be in the conference room to field questions from callers, a sort of electronic phone-in. Unfortunately, this sort of thing never seems to happen in the UK, perhaps if anyone from 01 is reading...

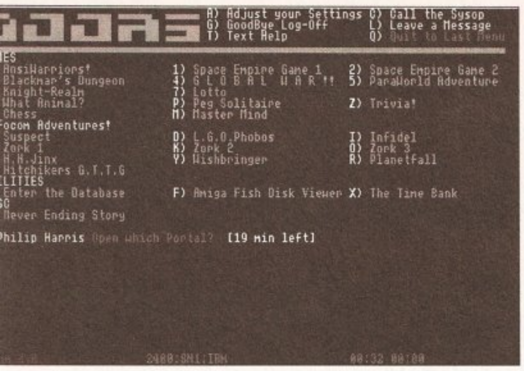
CONCLUSIONS

01 for Amiga is an excellent board. The sysops and callers are true Amiga fans and you're highly likely to meet well known names from the Amiga world, particularly programmers and journalists.

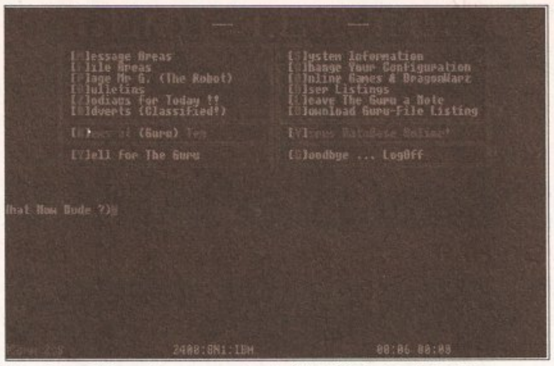
The only complaint I have is that the menus are a bit bland and the organisation a little sloppy. Text files tend to scroll off the screen before you get a chance to read them properly, that sort of thing. It doesn't detract from the board too much though and the content more than makes up for it.

GURU-10

The second board we're going to take a look at is the Guru-10 BBS, an Amiga and PC board, based on a PC using the *Remote Access* software. *Remote Access* is a very popular and reliable BBS system, used by a lot of PC boards these



Chiba City's strongest point is on-line games. You can also get to the Fish database and the time bank from here



The Guru-10 main menu, including that useful virus database, too bad it's for the PC



The Guru-10 games area, not as many as Chiba City has, but it does have 'Inter BBS' games

This month our comms expert, Phil Harris, takes a look at three Amiga bulletin boards – Chiba City, 01 for Amiga and Guru-10

days. It also has a variety of useful utilities available for it which make for interesting boards.

Guru-10 has a pretty short registration sequence but you are then asked at the main menu to fill in a second "form". This asks for things such as your age, address, occupation and why you call bulletin boards. Once you've filled all this in the sysop will verify the details and within about 24 hours you'll become a registered member of the board. This gives you access to all the files areas.

Guru-10 asks for your date of birth. This is used to tell people when your birthday is coming up so that they can send you a message. This is a good idea that is becoming more common throughout the comms community.

The Guru-10 bulletin area features a few interesting files including a plain English guide to public domain and shareware and its variations. There is also a complete set of download and upload stats for you to find out which are the most popular files.

MESSAGES AND FILES

Of course there are messages, seventeen different areas, the majority of which are Fidonet echoes. And there are files as well. Again there are 17 areas but the majority of these are PC-based which is a shame. The majority of popular Amiga files are available though and it also provides you with a good opportunity to upload files the board doesn't already have.

Guru-10 also has some interesting on-line games: *Dragon Warz* and *ISA* in particular are unique in that you play against other callers on other boards running the software, not just against local players.

Each night the moves which have been made are transferred via EMail to other boards running the software and the game continues. That way, you can find yourself playing people from hundreds of miles away, in a similar manner to a play-by-mail game.

The board also features an on-line virus database. At first sight this seems a great idea, but unfortunately it's only for PC viruses. Perhaps an Amiga programmer might like to come up with something similar for the Amiga.

CONCLUSIONS

Guru-10 is a very colourful board. The sysop puts a lot of effort into the look and feel to make sure you enjoy your visits to the board.

File and message coverage is reasonably good, and there is an off-line reader available to keep those bills down. The internet on-line games are a nice twist, hopefully they'll become more popular in the near future.

CHIBA CITY

I've mentioned Chiba City before but it's well worth an even closer look. Based in Whitburn, Chiba is another Amiga-based board, this time running some software called *Star-Net BBS*.

Star-Net is closely based on the Amiga BBS, *Paragon*. This has been very popular in the past and with its new owner is likely to become even more popular in the future. Chiba City is also a technical support board for *Star-Net* so anyone who owns the program can download updates from the board itself.

The name Chiba City comes from a series of books written by science fiction author, William Gibson. The Cyberpunk genre named after his creation *Cyberspace* is becoming very popular, particularly with the advent of virtual reality. The sysop of Chiba City has tried to give the board a cyberpunk feel by using Gibsonesque terminology and phrases. The Amiga area is called Amiga Warez and the games area is called Cyberspace.

The menus have also been given a computer feel, as though they are printed on a computer print-out. This works well but could be extended even more, I get the feeling it is all a bit half-hearted.

The reliability of *Star-Net* must be in question at the moment, the Chiba City user database crashed recently so all users have had to re-register. Whether this will affect the popularity of the board is difficult to say, but I'm sure some callers won't bother to go through the hassle again.

AMIGA AND PC

Again, Chiba City is a PC and Amiga board although as it runs on an Amiga, the emphasis is perhaps more on the Amiga. The file areas reflect this although there aren't that many (seven). They do contain most major programs though, and a few other less well known programs. The areas covered are pretty wide so you tend to get a lot of files in each area. And of course there is a selection of message areas.

Chiba City really shines at on-line games. There are no less than 23 on-line games for you to play with, including ten Infocom adventure games – beware though, because these can be expensively addictive. There are also some more common games, including Chess, *Master Mind, Lotto* and a trivia game, as well as a couple of space battle games which are good fun.

Chiba City also includes a Fish database link although it doesn't let you download the files you find, you should go to 01 for Amiga for that. It is a helpful facility though, enabling you to find the programs you want before your order them from a PD company.

The program itself is easy to use, you just enter the number of the disk you want to look at, or a range of disks and away you go. You can also find the latest version of a particular program and you get the full descriptions for each program, not a cut-down summary.

You'll find the sysop of Chiba City very friendly, more than happy to chat and give you some help in return for an upload or two. There is also the possibility that he will be writing his own BBS system in the future. We'll be keeping an eye on him and keep you posted – it's about time the UK had its own BBS system.

CONCLUSION

Chiba City is a well presented board, with a slight Cyberpunk feel which will make sci-fi freaks feel right at home.

The file and message areas are good but the files areas in particular could do with being categorised more. All in all, Chiba City is a very good board. AS

COMING NEXT MONTH • COMING NEXT MONTH

That's it for now, I hope you enjoy visiting these three boards. If you like the board, drop the sysop a note and remember to mention *Amiga Shopper*.

Next month I'll be taking a look at comms from a beginner's point of view. I'll take you step by step through a BBS log-on and registration so you know exactly what to expect. I'll also be giving some coaching on the various areas of the boards, including messaging, uploads and downloads. Until then, happy comms.

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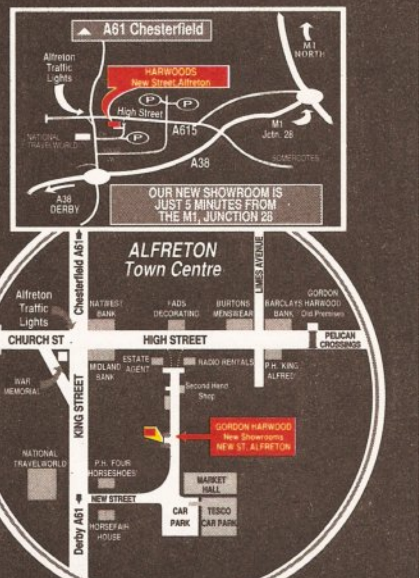
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The Closer you look, The Better we look

AMOS Action

Jason Holborn takes a look at a new extension for AMOS, reviews a handy manual for would-be games programmers and unveils the secrets behind writing maze games

It's been a busy month in the world of AMOS. After the drought of news and products that I had to face last month, the flood gates have suddenly opened and my desk has become awash with new bits and pieces to make the life of an AMOS coder that bit simpler. As well as the usual selection of new PD utilities and demos, I've received yet another extension for AMOS that extends the language still further.

I've been thinking hard over the past couple of weeks about the sort of features that Europress ought to be including in the next release of AMOS, *AMOS Professional*. Try as I might, I could only come up with a single suggestion – ARexx support. Whether this is a reflection of my lack of imagination or a testament to AMOS' power is up to you to judge. Despite this, I feel that ARexx support should be at the top of Europress' features hit list.

Although I'm a great fan of AMOS, I have to admit that I've been having a lot of fun with ARexx just recently (check out my new ARexx column on page 88 of this issue). If AMOS were to include ARexx support, it could be used to code anything from complete front ends for multimedia systems, to point of sales and shells for other applications. Europress really should think seriously about this – If ARexx support were to be included, I can see AMOS being taken on by a lot of professional programmers simply because it would be the only language that could talk to and control other applications.

NCOMMAND UPDATE

Oasis Software has announced the release of *NCommand* version 2.04, the latest release of its Workbench 2.0-like user interface extension for AMOS. *NCommand* enables you to produce AMOS applications with the same look and feel as Workbench 2.04, the latest release of the Amiga's operating system, complete with radio buttons, scroll gadgets and other elements of the Amiga's GUI system.

As well as a couple of cosmetic changes, this latest release includes a number of enhancements to the existing *NCommand* gadget and requester types including the *NCommand* file requester, radio gadgets and the default colour palette which now conforms exactly to Commodore's defaults. For *NCommand* to reach version 2.04, 11 new commands have been added including FASTDIR (which speeds up file requester operations), FIRSTDIR_UPDATE (informs the system that the directory list has been updated without having to read it again from scratch), PROGRESS (adds a trace mode to *NCommand*), SLDH (moves slide bar gadgets under software control), TXT_DISPLAY (used to display a text file from within a program) and GBBOX (creates a button box).

> **"NCommand enables you to produce AMOS applications with the same look and feel as Workbench 2.04..."**

Two of the *NCommand* utilities have also been updated. The screen designer has been updated to allow use of *NCommand*'s new facilities and the Graphic Converter utility will

AMOS ANSWERS

If AMOS has you baffled, let Jason Holborn put your mind at rest

POWER PACKED LIBRARY

I am in the process of writing a word processor using AMOS and would like to be able to edit text files that have been crunched using Nico Francois' excellent *PowerPacker* utility. I understand from the documentation that this can be achieved by opening and using the routines contained within Nico's Powerpacker.library file included on the program disk. How can I do this?

I also need to be able to access the dos.library so that I can obtain disk statistics such as the amount of free space available etc. Any help you can give will be greatly received.

Jon Simons
Pinner, Middlesex

Short of using the operating system to open the library and then using library offsets, as far as I am aware there is no way to access the powerpacker library from within AMOS. As for accessing the dos. library for disk statistics – why? AMOS already includes a comprehensive selection of disk management commands and functions including DFREE (returns the amount of free space on a given disk), KILL (deletes a file), RENAME (renames a file) and EXISTS (checks whether a file exists on a given disk). Use these instead – they're far less hassle to use than their dos.library equivalents.

If you insist on using the dos.library routines though, the function you need is called =DOSCALL and is documented on page 287 of the AMOS manual. This function requires a pretty good understanding of the Amiga's ROM kernel and the format for passing parameters via the 68000's data and address registers, so you may want to stick with AMOS' own routines (I know I would!).

VENTURING FORTH

I would like to write an adventure game on the Amiga and I was wondering whether Europress' Easy AMOS was up to the task. Having used the *Quill* and Incentive's *Graphic Adventure Creator* on the Commodore C64, I haven't yet seen a program which comes close to either on the mighty Amiga.

The adventure game I have planned will have various puzzles, plenty of locations and intelligent computer-controlled characters who – as well as being able to interact with the player – can lead 'lives' of their own. Please help.

Stuart Hardy
Sheffield

There's no doubting that Easy AMOS is up to the task, but – as is the situation with all programming languages – are your programming skills as equally well qualified? Both the *Quill* and *GAC* take a lot of the work away from the programmer so unless you've had experience coding adventure parsers in the past, I doubt whether you'll be able to jump straight in and start coding.

You could try Aegis' *Visionary* (read my review in *Amiga Shopper*

now automatically convert 32-colour Amiga IFF images to ST 16-colour format. There's also a new Address Label printing utility which not only shows off *NCommand* in action, but is also jolly useful.

Existing users of *NCommand* can upgrade to the new release by sending £1 plus their original disk. For the rest of you though, the full *NCommand* package costs £7.50 and is available from Oasis at 392 Birch Rd, Wardle, Rochdale, Lancs OL12 9LX. Alternatively you can call Oasis direct (after 6pm please!) on 0706 376572.

"D-Sam adds no fewer than 46 new commands and functions to AMOS..."

PLAY IT AGAIN SAM!

If you're starting to feel held back by AMOS' sound commands, then no doubt you'll be interested in a new extension from AZ Software.

Called *D-Sam*, AZ's extension adds no fewer than 46 new commands and functions to AMOS which will enable you to write programs that can play sampled sounds directly from hard disk, floppy disk or memory.

Even if you have an Amiga with no more than 512K of memory, *D-Sam* will enable you to play samples of over 800K in size simply by pulling them in directly from floppy disk.

On a machine equipped with a hard disk, the size of your samples is limited only by the size of your drive! *D-Sam* also provides compatibility with Aegis *AudioMaster III*'s sequenced sample facility, enabling you to play parts of a sample in a sequence, giving the impression of a much longer sample than is actually being played. Other *D-Sam* features include support for sample fading, oversampling, playing of raw and IFF samples and direct support for compressed samples.

D-Sam costs £19.95 and is available from AZ Software at AZ House, Broadfield Road, Eastington, Stonehouse, Gloucestershire.

BOOK FOR BOFFINS

If you're after a good book to read through the midnight hours, then look no further than Stephen Hill's *Amiga Game Maker's Manual*, a new release from Sigma press, written specifically for AMOS users.

The 400-page book has been designed as both an introduction to the AMOS language and games programming in general. If you've ever wanted to unleash your gaming ideas, then this may well be the book you've been waiting for.

The book takes you slowly through the basics behind the important aspects of games programming such as opening and scrolling screens, using maps, blitter objects and sampled sounds through AMOS Basic.

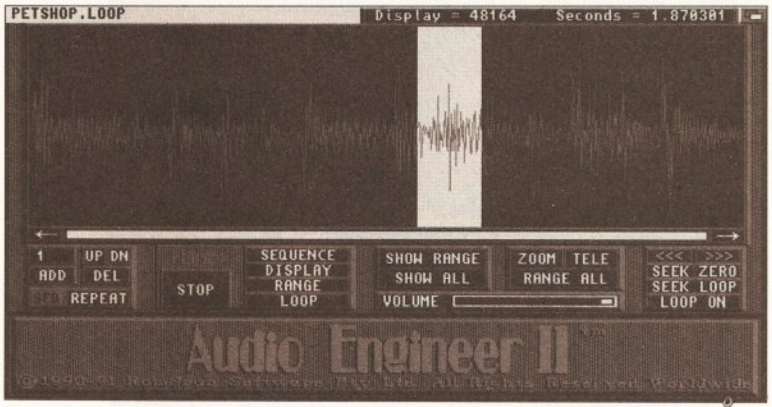
Once all this theory is safely implanted, Stephen Hill shows you how you can put it all into practice within your own games.

For the arcade game programmers among you, the book shows you how to move sprites around the screen at high speed, how to implement fire control, collision detection and background animation. Other types of game covered include simulations, flight simulators, adventure games and even RPGs.

It's obvious by reading through the first couple of chapters that Stephen certainly knows his stuff. Even some of the more complex aspects of AMOS programming are covered with the kind of crystal clear explanations that such subjects demand. To make things even clearer, the book includes a mass of demonstration listings that can be typed in and toyed around with.

As you can probably guess, I was impressed by the *Amiga Game Maker's Manual*. It's a very readable book which every would-be AMOS games programmer shouldn't be without.

The *Amiga Games Maker's Manual* can be purchased at all good book stores (ISBN No 1-85058-230-0). Alternatively if you can't manage to get hold of it in your local book store, you can purchase it directly through Sigma on 0625 536800.



Play *AudioMaster III* sequenced samples within your AMOS programs with AZ Software's new *D-Sam* AMOS extension

WHERE IS IT?

Those of you trying to locate the AMOS for Beginners section in this month's AMOS Action will have realised that it isn't there.

We had to drop this regular part of the AMOS column for this month simply because of the amount of space required to explain the maze game routines covered in this month's games programming section.

Rest assured though that AMOS for Beginners will be back with a vengeance next month!

more on page 115

issue 17). Although *Visionary* does make programming adventures easier, it too relies on previous experience from the programmer. Alternatively, why not check out a new AMOS PD disk called *ABC* (*Adventure Bank Creator*) which contains a program which claims to be a complete adventure writing system. It's available from the official AMOS PD library ☎ 0792 588156. I'll be featuring it in next month's issue.

JOYSTICK PROBLEMS

Whenever I play a game using the joystick, the player's sprite always seems to end up at the top of the screen. Now that I've started to write my own games in AMOS, I find that exactly the same is happening. Have I got a virus? I've checked through all my disks using a number of different virus killers, but none of them have managed to find anything suspicious.

Nick Banbury
Mansfield, Notts

I've got some good news for you and some bad news. First the good though – there's nothing wrong with your Amiga or AMOS. The bad news though is that it sounds to me that your joystick has kicked the bucket. Either take it along to your local store for repair (joystick problems are usually minor) or treat yourself to a new one.

MUSIC MAESTRO, PLEASE!

I am writing a music composition program in AMOS and I would like to be able to save scores in AMOS Music Bank Format. Could you please tell me where I could obtain the details of this format?

Simon Lewis
Exeter, Devon

You'll be pleased to learn that you don't have to construct the file format yourself – all you have to do is to save out the music bank using the AMOS command SAVE "Filename",3 (bank 3 always contains AMOS sound track data). Hope this helps!

ICON DO IT

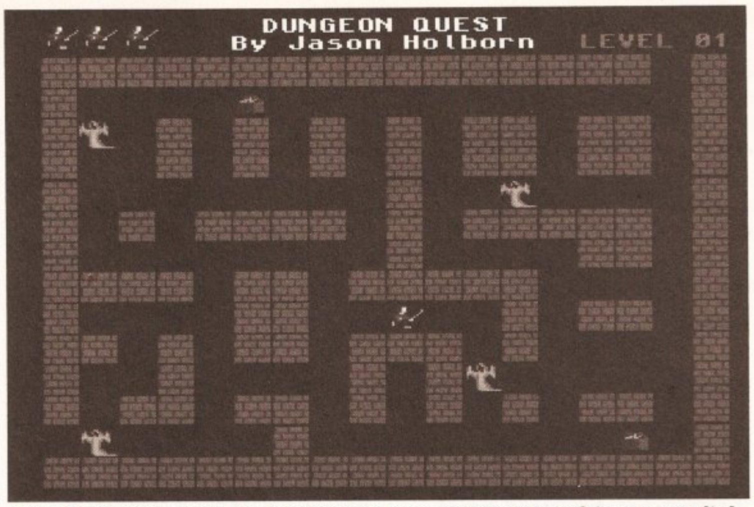
I want to write a scrolling shoot 'em up game that employs a continuously changing background. I've tried the source code you printed in a recent issue of *Amiga Shopper* for hardware scrolling, but using the scrolling technique tends to eat up a lot of memory. Is there a more memory-efficient way of achieving the same results?

Ben Taylor
Aberdeen

What you need to do is to use the AMOS Map Editor and Icon commands to construct your game's background graphics. The Map Editor works by splitting the background into a series of tiny graphic blocks which can be used over and over again within the same scroll without eating up large chunks of RAM. This is actually exactly the same technique that professional programmers use, so it's a tried and tested programming technique. I'll be covering both the Map Editor and Icon commands in the very near future, so stay tuned for more.

HELP! I NEED A HOLBORN

Every month our resident AMOS genius (wot me? – Jason) answers your AMOS-related problematic prose within these very pages. If there's an aspect of AMOS that is troubling you, then send you letters to Jason Holborn, Amiga Shopper, Future Publishing Ltd, 30 Monmouth Street, Bath, Avon.



***Ultima IV* it may not be, but this game took no longer than 2 hours to write! Read this month's games programming feature and you too could produce your own maze game**

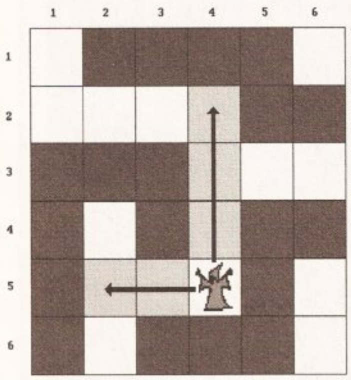
GAMES PROGRAMMING

MAZE GAMES

Crazy things these mazes – the source of confusion and the source of fun... Jason Holborn guides you through the code jungle

I had originally planned on writing a tutorial on grabbing and using sampled sound effects within a game, but the arrival of Steve Bennett's *Maze Crazy* source code got me thinking (Don't worry, we'll cover samples in a future issue). I'm sure that many of you will find Steve's code useful for developing your own games. Take a look at page 116 for the full listing of *Maze Crazy*.

There is however still a lot of extra code which needs to be added to turn this very useful routine into a workable game. Think on the following for example... how do you move the player's character around the maze without it walking through walls? How about adding a few baddies that can chase the player's character around the maze. How are they to be controlled so that they will act in an intelligent manner? All these questions (and more!) can now be answered.



To check whether the baddie has spotted the player's sprite, all blank squares immediately up, down, left and right of the baddie's position are checked. If the player is not spotted in any one of these four directions, before a wall is encountered, the baddie continues in search mode

AMOS ACTION

The movement control routine for the baddies which inhabit the maze constantly scans all exits for the player's sprite

YOUR MOVE, PUNK!

Upon first inspection, the most obvious way to control the player's movement around the maze is to use collision detection, but believe it or not there is a considerably easier method that is virtually fool proof. As you can see from the *Maze Crazy*

> **"The obvious way to control the player's movement around the maze is to use collision detection..."**

source code, the mazes are stored internally as a series of data statements containing nothing more than 0s (for an empty space) and 1s (for a graphic block). All the routine does that draws the maze is to interpret this data resulting in the beautiful mazes that you'll see on your Amiga's screen.

Now Steve's code may not be perfect, but it does have one major advantage over similar routines that randomly generate mazes – because the maze can be defined by the programmer, we can also use this data as an alternative to using collision detection.

As the maze is essentially an 18 by 14 grid containing either 0s or 1s, all we need to do is to treat the player's movement in the game as a series of steps through this grid expressed as a set of co-ordinates. For example, if the player was to be placed at position (2,2), he could therefore move (in a single step) up, down, left or right to positions (2,1), (2,3), (1,2) and (3,2) respectively – we'll ignore diagonal movement for the meantime.

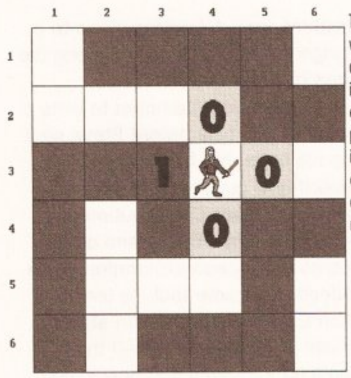
Obviously the code to handle this is very simple indeed. All you need to do is check the status of the joystick each time the player's character once during the main game loop – if JUP() returns a value of –1 then decrement the Y co-ordinate, increment it if JDOWN is true and so on.

Now this is all well and dandy providing that there are no walls in the way – if there are, the player's sprite will simply walk straight through them as if it were a ghost. How do we stop this from happening? I'll explain.

When the joystick is tested, the first thing that the movement routine should do is check to see whether the grid position that the character would move to is actually an empty space. It does this by checking through a dimensional array containing the same maze data that the *Maze Crazy* routine uses to draw the maze.

Let's say for example that the player's sprite is at position (2,2) and the player has attempted to move the sprite to position (2,1). If there was a wall there, the player's sprite should therefore not move. To achieve this, the movement routine would calculate the theoretical new position and then check the maze data to see if the value held within (2,1) is a 0. If it is, the movement is allowed. If is isn't though, the player's joystick input should simply be ignored resulting in the sprite staying in its original position.

You're probably thinking that this technique would result in some rather jerky movement – after all, the player's character is moving 16 pixels in a single turn. Not so with some clever programming. All you need to do is to delay joystick input for a couple of moves and use this delay to smoothly scroll the sprite. Simple, eh?



To stop the player's sprite walking through walls, the maze data used to construct the maze is consulted. If a 0 is encountered in the direction the player wants to move, the move is considered legal. If a 1 is encountered, the move is illegal and therefore the sprite should not move

AMOS ACTION

All movements within the maze are controlled by checking whether a wall blocks the sprite's movement. Without this, both the player and the baddies would walk straight through the walls

BRING IN THE BADDIES!

Now we have our hero happily running around the maze, we now need some baddies to chase after him. Movement of the baddies isn't a problem – all you do is to adapt the routine you used for the player's sprite so that the baddies use exactly the same rules of movement but under computer control. What we do need though is a routine that adds a little bit of intelligence to our baddies so that they will actually pursue our hero around the maze in true *PacMan* style.

Although such a routine may initially appear rather complicated, the best way to design a routine like this is to draw up a set of rules of behaviour that the baddies will follow.

BACK TO REALITY

Despite the fact that some games will have baddies pursuing the hero no matter where they are within the maze in relation to the player's sprite, this isn't very realistic. If you think about it, if the maze was real and you were being hunted down by a pack of wolves wandering around

the maze, they'd be as lost as you are. It is therefore only necessary to have the baddies pursuing the hero when they can actually see him. If they can't see him, they'll just continue searching around the maze until they do find him. This obviously gives the player an advantage because you know where they are,

> **"The best way to design a routine is to draw up a set of rules of behaviour for the baddies to follow..."**

but they're totally blind until he comes into full view.

What we therefore need to code this routine is a method of transferring all this theory into practice. The baddie movement routine must therefore work in two modes – in a search mode (the baddie hasn't spotted the player) and a pursue mode (he's after him).

SEARCH AND FIND

The search mode is pretty straightforward – all you do is start the baddie in a particular position and then generate a random number between 1 and 4 that is used to decide in which direction the baddie is to move – up if the answer is 1, down if it is 2, left if it is 3 and right if it is 4. We then use our movement routine to check that the monster can actually move in this direction. If it can't, a random number is generated until a legal direction is decided upon.

MONSTROUS DECISIONS

Once the monster has decided which direction it wants to move in, we want to keep him moving in that direction until he either comes into contact with a wall or the player's sprite. You should therefore have a variable that contains the number which was generated to decide upon the baddie's direction of movement.

Each time the baddie is moved another square, the movement routine checks the contents of this variable and increments of decrements the appropriate co-ordinate.

Now that search mode is out of the way, we need to add pursue mode which will give the baddie the ability to change its direction suddenly if the player's sprite comes into its line of sight. This too is actually a very simple routine. All you need to do is continuously check all the clear blocks directly up, down, left and right of the baddie.

If the routine encounters a wall in any one of the four directions before it encounters the player's sprite, this direction is ignored. If the player's sprite is encountered though, the baddie's direction of movement is altered so that it starts to move in the direction of the player's sprite – this pursue mode then continues until the baddie either tracks down the player or the player manages to move out of the baddie's line of sight (if this happens, the baddie has effectively lost the player and will therefore start to search again).

INSTANT GAMES

Phew! We've covered some pretty heavy routines this month, but you should now be in a position to write

> **"... if the maze was real and you were being hunted down by a pack of wolves, they'd be as lost as you..."**

anything from a *PacMan* clone to a dungeon exploration game along the lines of SSI's *Ultima IV*.

I had never attempted to write a game of this type before Steve sent me his code, but I even surprised myself how quickly I was able to adapt the *Maze Crazy* routine to produce a fully working and quite playable Dungeon exploration game. Indeed, the game took no longer than 2 hours to code from start to finish! Try it for yourself – I think you'll be surprised just how simple maze games are to code! AS

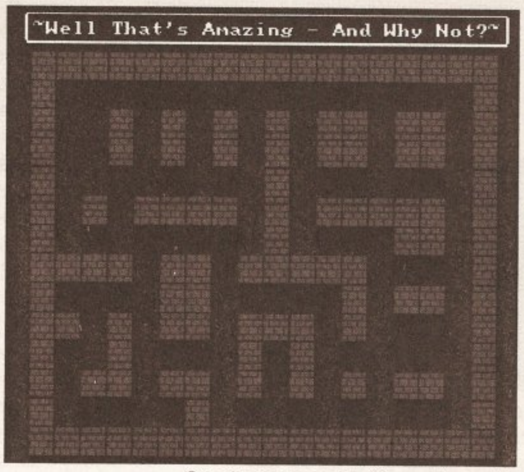
WHAT'S IN STORE FOR YOU NEXT MONTH...

If this month's installment hasn't already got you frantically coding, then just you wait for next month's issue. I'll be take Steve's *Maze Crazy* code one step further – that is, into the third dimension. With the knowledge I'll be imparting next month, it will be perfectly possible for you to write your own *Dungeon Master* clone! Can you bear the wait?

AMAZE-ING ROUTINE

A couple of *Amiga Shopper* readers have written to me in response to Derek Dobson's request for a routine that generates mazes. After playing around with all the entries, the two best routines came from Pete Lockwood in West Sussex and Steve Bennett in the West Midlands. Pete's routine performed very well indeed, but was rather large so I'm unable to print it within these pages (perhaps I'll pass it on to Cliff for inclusion in the listings section). Instead I've included Steve Bennett's routine which generates mazes from data tables held within the program.

The *Maze Crazy* code is fairly straightforward. To use it simply create some 14x14 pixel blocks using *DPaint*. You need only create one block if you wish, which would be part of a wall. When you have drawn the block, grab it as an ICON using an ICON grabber or load the picture into AMOS and grab it from the screen. The program then creates a simple maze. If you want to design other blocks then simply grab them from the screen and paste them on to the screen by changing the DATA statements in the routine to the number of the block you wish to paste down. To call the *Maze Crazy* routine, simply issue the command 'PROC CreateMaze' from within your main game loop.



Create mazes with Steve Bennet's great little *Maze Crazy* procedure featured above

```
REM ** Maze Crazy
REM ** Written by Steve ↵
Bennett
'
Procedure CREATEMAZE
'
Screen Open
0,320,256,32,Lowres
Flash Off : Curs Off
Ink 5
Bar 0,0 To 14,14
Get Icon 1,0,0 To 14,14
Cls 0
Pen 30 : Paper 0
'
Y=25
For T=1 To 14
For X=15 To 294 Step 16
Read I
If I<>0 Then Paste Icon X,Y,I
Wait Vbl
Next X
Add Y,16
Next T
'
Repeat : Until Mouse Click
'
'*** Maze Data
'*** 1 = Wall Block
'*** 0 = Empty
'
Data 1,1,1,1,1,1,1,1,1, ↵
1,1,1,1,1,1,1,1,1
Data 1,0,0,0,0,0,0,0,0,0, ↵
0,0,0,0,0,0,0,1
Data 1,0,0,1,0,1,0,1,0,1, ↵
0,1,1,0,1,1,0,1
Data 1,0,0,1,0,1,0,1,0,1,0, ↵
1,1,0,1,1,0,1
Data 1,0,0,0,0,0,0,0,0,1,0, ↵
0,0,0,0,0,0,1
Data 1,0,1,0,1,1,1,1,0,1,0, ↵
1,1,1,1,1,0,1
Data 1,0,0,0,0,0,0,0,0,0, ↵
1,0,0,0,0,1,1,0,1
Data 1,1,1,1,0,1,1,0,1, ↵
1,1,1, 1,0,0,0,1
Data 1,0,0,0,0,1,1,0,0,0, ↵
0,0, 1,0,1,1,0,1
Data 1,1,0,1,0,1,1,0,1,1, ↵
1,0, 1,0,0,0,0,1
Data 1,0,0,1,0,0,0,0,1,0, ↵
1,0, 0,0,0,0,0,1
Data 1,0,1,1,0,1,1,0, ↵
1,0,1, 0,1,0,1,1,0,1
Data 1,0,0,0,0,0,1,0, ↵
0,0,0, 0,0,0,0,0,0,1
Data 1,1,1,1,1,1,1,1, ↵
1,1,1, 1,1,1,1,1,1,1
'
End Proc
```

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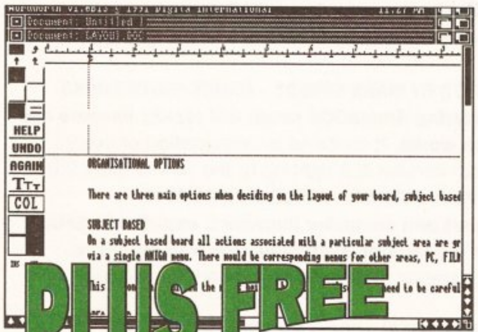
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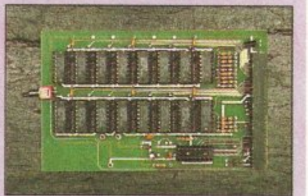
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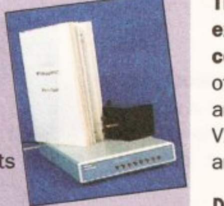


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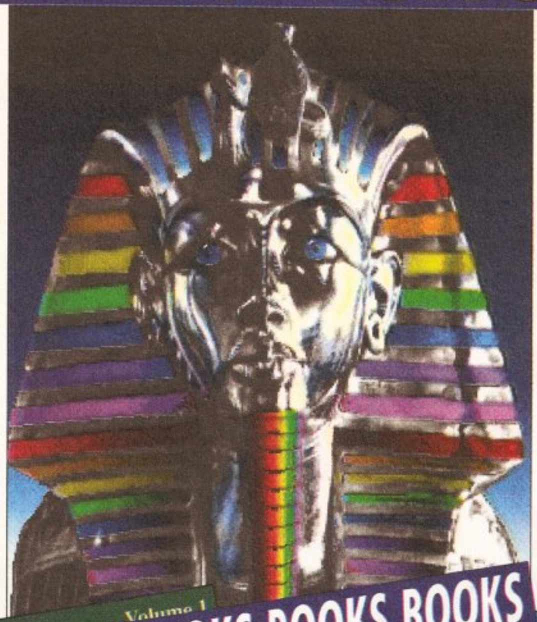
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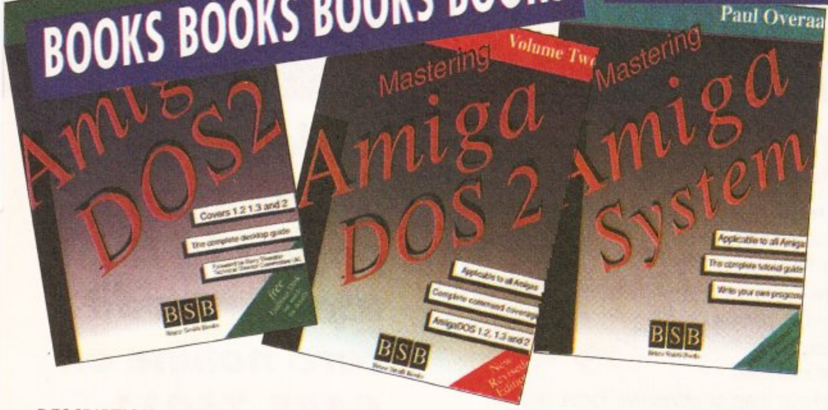
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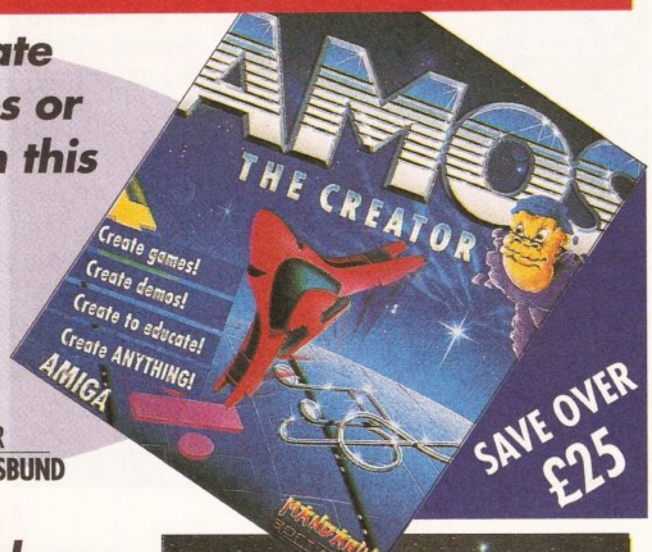
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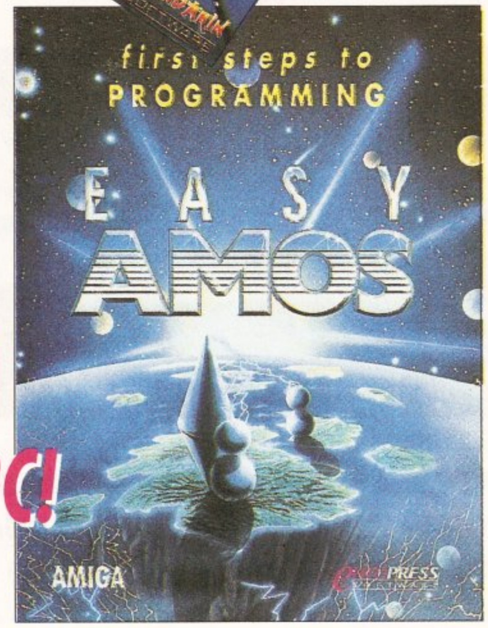
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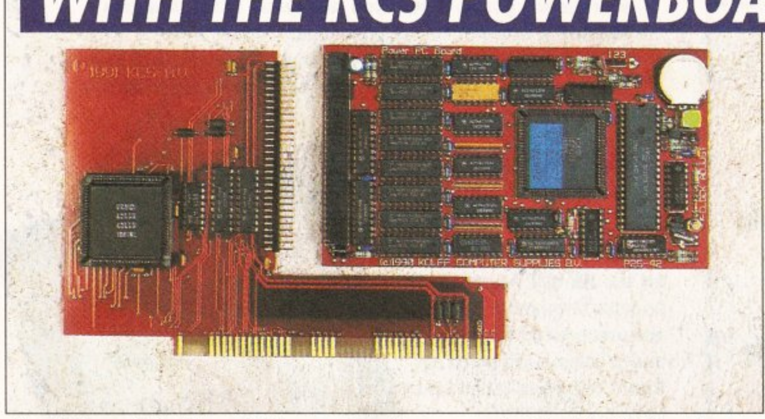
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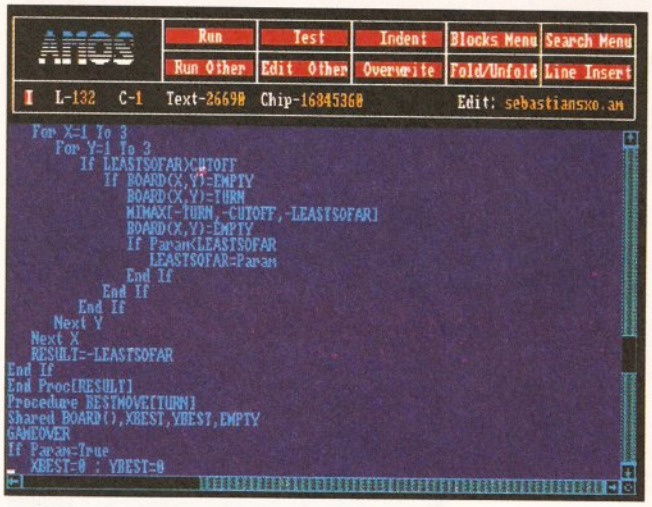
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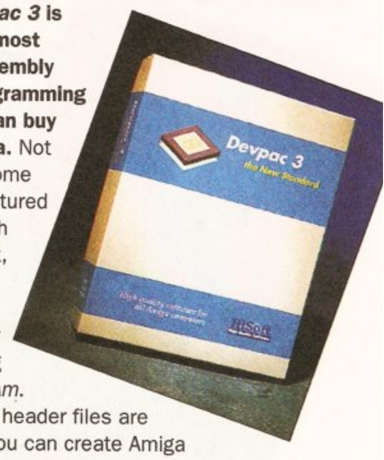
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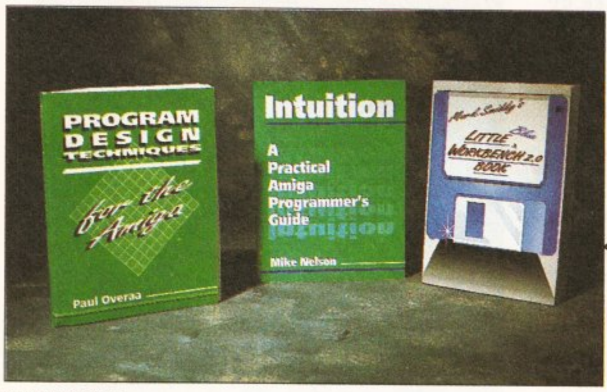
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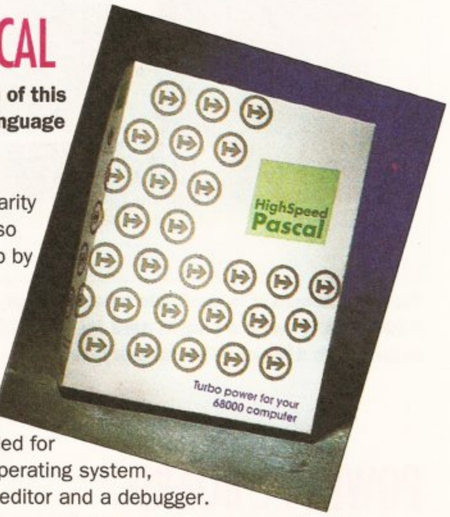
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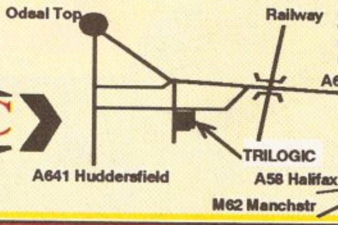
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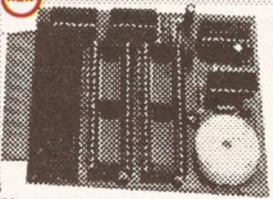
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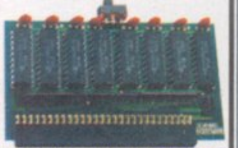
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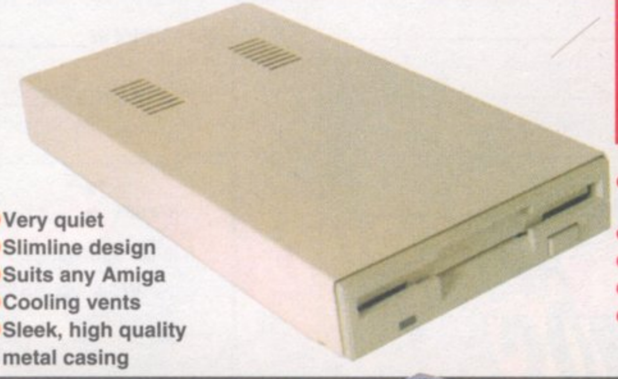
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About....

The KCS Power PC board is a complete #11Mhz 1Mb PC sub-system that can be fitted to any Amiga in minutes.

Based around NEC's highly successful V30 CPU, the Power PC Board offers a very high degree of compatibility at machine language level, yet runs faster than an equivalent Intel 8086.

The 1Mb of Autoconfig™ memory can be accessed by all current Amiga models including the A500 Plus. Even the original A500 can access 512K as a standard expansion with clock; plus a 512K RAM disk.

Adored by critics and users alike, the KCS Power PC Board is a real alternative to buying a complete PC clone.

Installation

The KCS Power PC board fits to any Amiga in minutes:

- On A500 and A500 Plus machines it simply slides into the trapdoor expansion; and doesn't invalidate your warranty!
- On bigger Amigas, such as the 1500/2000/2500/3000, it drops into a vacant Amiga slot using the custom designed adaptor board.
- Once fitted, your Amiga can be switched into PC mode simply by clicking an Icon. Just reset and it's an Amiga again.

No fuss, no hassle. Just two machines in the space of one.

Video

- Supports the majority of EGA and VGA modes in 16 glorious colours and monochrome - graphics up to 640x480 and text too. Interlace is required for some modes but a software flicker fixer is built in.
- Other video modes include MDA and CGA text and graphics. Also supports Tandy colour graphics adaptor and Hercules monochrome.
- EGA and VGA graphics can be displayed on a domestic TV or monitor. Unlike *real* PC's, no extra hardware is required.

Disk

- Up to four Amiga drives can be connected to your system and accessed in PC modes as 3.5" 720K or 5.25" 360K. Typical disk access is at least twice as fast as most real PC clones!
- DOS can be started from any mounted drive 5.25" or 3.5" and most Amiga hard drives.
- Supports most popular hard disks including GVP Impact, Supra and A590 (Omtl and SCSI).
- A massive 200K ramdrive (up to 8Mb with expansion) is available in PC mode and it's PC-reset proof too.

Memory

- Even with a base Amiga 704K is free for DOS programs (640K in EGA and VGA modes).
- EMS (expanded memory) is supported allowing you to run Microsoft Windows without problems and store massive files in Lotus 1-2-3. So, if you have 8Mb on board, the PC can use it.
- XMS (extended mrmory) is supported - even though this is not usually possible on NEC V30 machines.

Speed

Its Landmark speed puts it way ahead of many true PC systems - it even compares favourably with many AT clones.

However, the crux of the matter lies with the video speed; and this, as many critics have noted is where the KCS Power PC Board scores over all others. It's no use having a wizz-bang processor if the screen takes several seconds to redraw itself.

- Tests in text modes have shown it is several times faster than even AT clones with dedicated video hardware. Even in graphics modes, it's no slouch although the emulation is limited by Amiga hardware.
- Add a processor accelerator card, and the 32-bit clean KCS cache software will use it to its full advantage.

Mouse

- Automatic serial mouse emulation is supplied as standard - using your existing Amiga rodent.
- Mouse can be configured as COM1 or COM2.

Joystick

- Up to two sticks can be employed at any time. You decide how they are arranged.

Printer

- Your Amiga's parallel port is accessed as LPT1 in PC mode.

Serial

- DOS usually supports two serial ports, but one is taken by the Amiga mouse. The Amiga's serial can be set as COM1 or COM2 as desired, ie for MODEM etc, up to 19200 baud full-duplex.

Sound

- PC sound is supported, but there's an additional volume control available in software.

Works On....

- All Amigas (except the A1000) fitted with Kickstart 1.2 and Workbench 1.2 or higher.
- Extra memory is not required, but full use will be made of extra hardware, like accelerators, flicker fixers, modems etc.

Help!

- We want you to get the most out of your system so we offer a comprehensive, free telephone helpline service to all registered users.

Updates....

- Since the hardware is a complete PC in its own right, all updates are completely software driven. Registered users can update at any time for a nominal fee to cover media and shipping costs.

"PC emulation is a contentious issue - but the KCS Power PC board is the only one to carry my personal recommendation. It is an excellent product that does all it claims and does it well."

comments Mark Smiddy, co-author of Mastering AmigaDOS 2.

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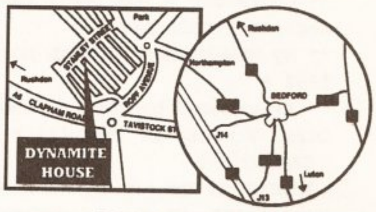
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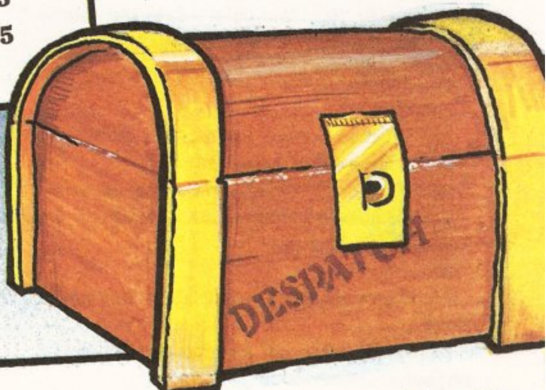
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LISTINGS LISTINGS

THIS MONTH: CONVERTING BETWEEN 3D OBJECT FORMATS

Convert your 3D objects from Imagine to Videoscape3D format with this handy Amiga Basic utility. Remember: we pay £20 for any programs we publish

Here's a great program for three dimensional modellers. By Vander Roberto Nunes Dias of Brazil, it will convert 3D objects defined in Impulse's *Imagine* to the format required by Aegis' *Videoscape3D*.

The program is written in Amiga Basic, so it should be a breeze to convert to HiSoft Basic, and fairly easy to convert it to other dialects such as GFA Basic. The program itself couldn't be easier to use: just enter the names of your source and destination files (including path names if necessary) and away it goes. Bear in mind that colour information cannot be translated with 100 percent accuracy.

Many thanks, Vander, for your entry. We'll be sending you £20 for your efforts.

As always, we're interested in submissions for any application in any language, but we can't print programs that rely on binary files. What we'd especially like to see, inspired by Vander's utility, is a program to convert between the IFF picture format and picture formats used on other machines. We're offering a special prize of £50 for the best of these we see.

Pop your program on an AmigaDOS disk (along with source code if it is compiled or assembled), include a written description and send it all to:
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Include an SAE if you want your disk returning. AS

```
'* Converter - Impulse's IMAGINE1.0 to ↵
Aegis's VIDEOSCAPE3D *
'* By MEGANISMOS VIRTUAL MOVIE, April-↵
1992 *
'* Programmed by Vander Roberto Nunes ↵
Dias, Vitoria-ES (Brazil) *
  DEFINT A-Z
  WINDOW 1,"Converter IMAGINE-↵
VIDEOSCAPE, V1.0 - by MEGANISMOS"
Parade1:
```

Call subroutines to ask user for source and target file names, to copy the source file across to the RAM disk for an increase in performance, and to open the files

```
  GOSUB AskFiles
  GOSUB TransfSource
  IF FileErr=1 THEN PRINT "Press any ↵
key":T$=INPUT$(1):GOTO Parade1
  GOSUB OpenFiles
```

The variable 'Rec' is a pointer into the source file. Here it is set to the field which holds the number of points in the 3D object

```
  Rec=159
  GET #1,Rec ' Get high byte of word.
  NumPoints=ASC(Byte$)*256
  GET #1,Rec+1 ' Get low byte of word.
  NumPoints=NumPoints+ASC(Byte$) ' Comp↵
lement the integer.
  Rec=Rec+2
  ProxRec=Rec+12*NumPoints ' Beginning ↵
EDGE.
  PRINT "Number of points on source ↵
object:";NumPoints
```

The next line stores the required header information in the *Videoscape* file

```
  PRINT #2,"3DG1"
  PRINT #2,NumPoints
'***** Point conversion *****
  PRINT "Converting points...";
  Px=POS(0):Py=CSRLIN
  FOR Loop=1 TO NumPoints
    LOCATE Py,Px:PRINT Loop
```

The following retrieves a point from the source file in X,Y,Z format and stores it in the destination file

```
    GOSUB ReadPoint
    PRINT #2,X,Y,Z
  NEXT
  LOCATE Py,Px:PRINT "OK.";SPACE$(10)
  Rec=ProxRec+8  ' Point to Number_↵
Of_Edges.
  PushRec2=Rec+2 ' Save EDGE pointer.
  GET #1,Rec
  NumEdges=ASC(Byte$)*256
  GET #1,Rec+1 ' Get low byte of word.
  NumEdges=NumEdges+ASC(Byt↵
e$) ' Complement the integer.
  ProxRec=PushRec2+4*Num↵
Edges ' Beginning FACE.
  Rec=ProxRec+8 ' Point to ↵
Number_Of_Faces
  GET #1,Rec ' Get high bits of ↵
Number_Of_Faces.
  NumFaces=ASC(Byte$)*256 ' Save.
  GET #1,Rec+1 ' Get low bits of ↵
Number_Of_Faces.
  NumFaces=NumFaces+ASC(Byte$) ' Final ↵
value of Number_Of_Faces.
```

The pointer to the Face information in the source file is saved. The information is then skipped for the moment while the colour table is translated

```
  PushRec=Rec+2
  Rec=PushRec+6*NumFaces
  Token$="CLST"
  GOSUB FindToken
  Rec=Rec+6
  DIM Colors(NumFaces) ' Prepare to ↵
read Colors Table.
  PRINT "Converting color table...";
  FOR Loop=0 TO NumFaces-1
    GET #1,Rec ' Get the RED value.
    Rec=Rec+3 ' Skip the GREEN and ↵
BLUE values.
    ' I use only the Imagine's RED ↵
value, don't forget!
    Colors(Loop)=ASC(Byte$) ' Save the ↵
color.
  NEXT
  PRINT "OK."
```

Now to return to the Face data and convert it to *Videoscape*'s format. First the saved position of the Faces must be restored to the variable 'Rec'

```
  Rec=PushRec
  PRINT "Number of faces on source ↵
object: ";NumFaces
  PRINT  "Converting FACES...";
  Px=POS(0):Py=CSRLIN
  FOR Loop=1 TO NumFaces
    LOCATE Py,Px:PRINT Loop
    GOSUB ReadFace ' Return Edge1, ↵
Edge2 and Edge3.
    Register=PushRec2+Edge1*4 ' Calcula↵
te EDGE position acording to actual ↵
Edge1.
    SWAP Register,Rec ' Point it. (here↵
is a pointer to PNTS)
    GOSUB ReadWord ' Read number of the↵
first point of the first edge.
    L(0)=Word
    GOSUB ReadWord  ' Second point of ↵
the first edge.
    L(1)=Word
    SWAP Register,Rec ' Return to FACES.
    Register=PushRec2+Edge2*4 ' Calcul↵
ate EDGE position acording to actual ↵
Edge2.
```

```
    SWAP Register,Rec ' Point it.
    GOSUB ReadWord ' First point of the↵
second edge.
    L(2)=Word
    GOSUB ReadWord ' Second point of ↵
the second edge.
    L(3)=Word
    SWAP Register,Rec
    Register=PushRec2+Edge3*4 ' Same to↵
Edge3.
    SWAP Register,Rec
    GOSUB ReadWord
    L(4)=Word
    GOSUB ReadWord
    L(5)=Word
    SWAP Register,Rec
```

This is the heart of the converter. Any redundant points in the faces are removed

```
    ExistingPoints=0
    P(0)=-1
    FOR Loop2=0 TO 5
      Loop3=0
      WHILE Loop3<ExistingPoints
        IF L(Loop2)=P(Loop3) THEN Skip
        Loop3=Loop3+1
      WEND
      Skip:
      IF Loop3=ExistingPoints THEN
        P(ExistingPoints)=L(Loop2)
        ExistingPoints=ExistingPoints+1
      END IF
    NEXT
```

The following sorts the face points into order

```
    FOR Loop2=0 TO 1
      FOR Loop3=Loop2+1 TO 2
        IF P(Loop2)<P(Loop3) THEN SWAP ↵
P(Loop2),P(Loop3)
      NEXT
    NEXT
    A=P(0):B=P(1):C=P(2) ' The three ↵
different points on actual face.
    PRINT #2,3,A,B,C,Colors(Loop-1) ' ↵
Finally write the face on target.
    PRINT #2,3,C,B,A,Colors(Loop-1)
  NEXT
  CLOSE
  CLS
  PRINT UCASE$(SourceName$);" conv↵
erted... press any key to restart."
  ERASE Colors
  T$=INPUT$(1)
  GOTO Parade1
```

The following subroutine asks the user for the name of the file to be converted and the name to be used for saving the resultant file

```
AskFiles:
  CLS
  PRINT "<ENTER> without a name ends ↵
the program."
  INPUT "Source filename (Imagine) ↵
:",SourceFile$
  IF SourceFile$="" THEN CLS:END
  PRINT "<ENTER> without a name returns↵
to first question."
  INPUT "Target filename (Videoscape) ↵
:",TargetFile$
  IF TargetFile$="" THEN AskFiles
RETURN
```

The subroutine 'OpenFiles' opens the first file specified by the user to be read, and opens the second file ready to be written. The first source file, copied to RAM: for speed, is opened as a random access file; the second is a sequential file, its data being saved in a strict order

```
OpenFiles:
  GOSUB CheckSource
  IF FileErr=0 THEN
    OPEN "RAM:"+SourceName$ AS 1 LEN=1
    FIELD #1,1 AS Byte$
    OPEN TargetFile$ FOR OUTPUT AS 2
  END IF
RETURN
NotExist:
  PRINT "Error opening source file."
  FileErr=1
RESUME NEXT
```

This subroutine looks at the X,Y and Z coordinates of a point in *Imagine* format and converts them to the equivalent co-ordinates in *Videoscape* format

```
ReadPoint:
  GOSUB ReadWord
  X=Word:GOSUB ReadWord
  GOSUB ReadWord
  Z=Word:GOSUB ReadWord
  GOSUB ReadWord
  Y=Word:GOSUB ReadWord
RETURN
```

This routine reads a single word (two bytes) from the source file. The variable 'rec', which keeps a track of where we are in the source file, is incremented accordingly

```
' Return in "Word" and increment "Rec".
ReadWord:
  GET #1,Rec
  Word$=RIGHT$("00"+HEX$(ASC(Byte$)),2)
  GET #1,Rec+1
  Word=VAL("&H"+Word$+RIGHT$("00"+↵
HEX$(ASC(Byte$)),2))
  Rec=Rec+2
RETURN
```

'ReadFace' is used to aid conversion between *Imagine* and *Videoscape*'s face formats. The routine returns the three edges read from a triangular face in the source file

```
ReadFace:
  GOSUB ReadWord
  Edge1=Word
  GOSUB ReadWord
  Edge2=Word
  GOSUB ReadWord
  Edge3=Word
RETURN
```

This sets up an error interrupt and then attempts to open the user-specified source file to ensure that it exists

```
CheckSource:
  ON ERROR GOTO NotExist
  FileErr=0
  OPEN SourceFile$ FOR ↵
INPUT AS 1
  CLOSE
  ON ERROR GOTO 0
RETURN
```

The following copies the source file on to the RAM disk for quicker processing

This bit extracts the filename from the path held in the string 'SourceFile$'

```
TransfSource:
  GOSUB CheckSource
  IF FileErr=0 THEN
    Loop=LEN(SourceFile$)
    WHILE Loop>0
      Temp$=MID$(Source↵
File$,Loop,1)
      IF Temp$="/" OR Temp$=":" THEN ↵
OkExtr
      SourceName$=RIGHT$(SourceFile$,↵
LEN(SourceFile$)-Loop+1)
      Loop=Loop-1
    WEND

OkExtr:
    OPEN SourceFile$ AS 1 LEN=256
    FIELD #1,256 AS SourceBlock$
    ON ERROR GOTO NotRamDisk
    PRINT "Opening RAM:";SourceName$
    OPEN "RAM:"+SourceName$ AS 2 LEN=256
    FIELD #2,256 AS TargetBlock$
    ON ERROR GOTO 0
    IF FileErr=1 THEN
      PRINT "I'm sorry, but i need a ↵
RamDisk available."
      RETURN
    END IF
    PRINT "Wait..."
    FOR X=1 TO LOF(1)/256
      GET #1,X
      LSET TargetBlock$=SourceBlock$
      PUT #2,X
    NEXT
    CLS
    CLOSE
  END IF
RETURN

NotRamDisk:
  FileErr=1
RESUME NEXT
```

The subroutine 'FindToken' searches the source file for a string held in the variable 'Token$'. The variable 'Rec' holds the position of the string in the file; the routine returns 0 if the string is not present, 1 otherwise

```
FindToken:
  Pointer=1
  Found=0
  PRINT "Seeking ";TOKEN$;"...";
  Py=CSRLIN:Px=POS(0)
  WHILE Rec<=LOF(1)
    GET #1,Rec
    LOCATE Py,Px:PRINT Rec
    IF Byte$=MID$(TOKEN$,Pointer,1) THEN
      Pointer=Pointer+1
      IF Pointer>LEN(TOKEN$) THEN
        Rec=Rec+1
        Found=1
        LOCATE Py,Px:PRINT ↵
"OK.";SPACE$(10)
        RETURN
      END IF
    ELSE
      Pointer=1
    END IF
    Rec=Rec+1
  WEND
RETURN
```

Some program lines have to be split because of our column width. If you see the symbol '↵', don't split the line when you enter the program

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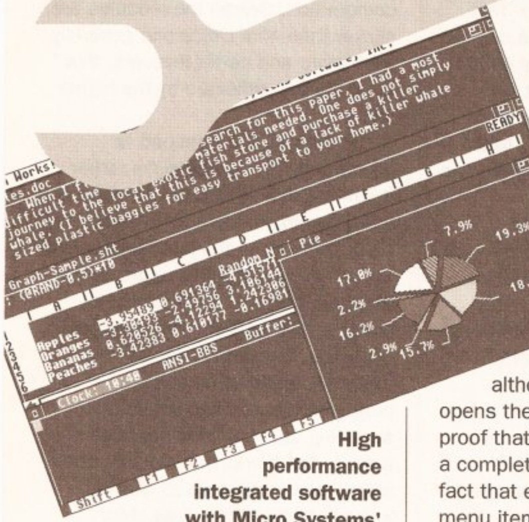
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No more spanners in the works

The Works Platinum* is often mentioned in passing, rarely discussed in detail – Mark Smiddy examines the main competitor to *Mini Office Amiga



High performance integrated software with Micro Systems' *The Works Platinum*

Europress Software is rightly making a lot of fuss about *Mini Office Amiga* (previewed in *Amiga Shopper* 17); it is a great budget package for the business on a shoestring. All the same, let's not forget it was Micro Systems Software which brought the first true integrated package to the Amiga in the form of the *Works*. Version 1.5 is reviewed here, although it premiered way back in 1991, making it quite ancient by today's standards. Nevertheless, careful programming has stood the test of time and *The Works*, performs on the latest A500 Plus machine just as well as it worked on the original.

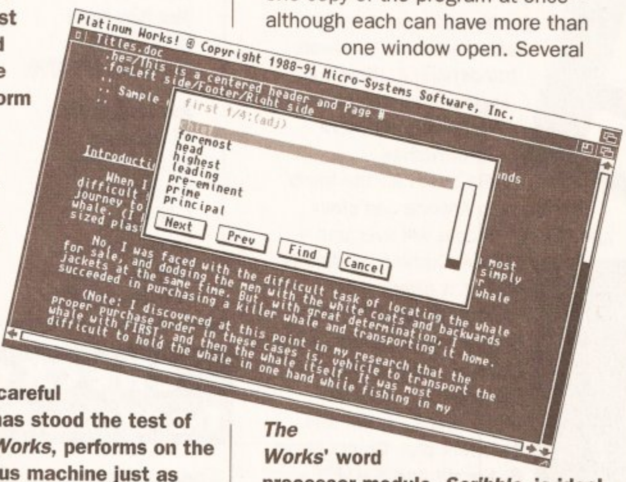
INSTALLATION

Installing *The Works* is a breeze. Considering this system's age, it still puts many others to shame with its clear simplicity and precise verbosity. Beginners can let the install process do it all for them, experts override one or more settings at the click of a mouse. Once up, *The Works* comes with four main modules – spreadsheet, word processor, database and communications – plus some supplementary utilities: *Sideways* (sideways spreadsheet printing), *Spellmate* (supplementary dictionary editor) and *DbMerge* (concatenate databases).

All are available from a simple, uncluttered menu-based front end: although opening a file type opens the correct module. Clinching proof that *The Works* was designed as a completely integrated system is the fact that each module has a separate menu item to activate the host module.

Memory permitting, (*The Works* requires a frugal 512K, thanks to intelligent use of a shared library) it is possible to launch two or more of the modules and multitask them – switching between each one simply by arranging the screens.

A useful feature, especially for beginners, is that it is not possible to accidentally launch, start, more than one copy of the program at once – although each can have more than one window open. Several other mainstream applications spring to mind that could benefit from the addition of this simple, but very user-friendly feature.



***The Works*' word processor module, *Scribble*, is ideal for bashing out lots of text**

WORD PROCESSOR

Scribble users will recognise this one straightaway because that's basically what it is.

Scribble has always been a word processor and, like Arnor's *Protext*, does not pretend to be anything else. So if you want a text and graphics WYSIWYG display, this one is not for

BEGINNERS — BEGINNERS START HERE — BEGINNERS

What is an integrated package?

Many suppliers would have you believing that an integrated package is no more than a bundle of old titles re-named and bundled together in the same box. This is not the case: a truly integrated package should be run from a common interface and have a "look and feel" common to all the modules. Also, any one module should be able to exchange data easily with any other – and the emphasis there is on *easily*! In practical terms every possible combination is not always viable or even useful. For instance it would be unusual to need to send data from a spreadsheet directly to the communications system.

How can I tell a package is integrated and not just a bundle?

In most circumstances, you can't. The best way is to read the reviews or ask someone who knows. A typical example of a bundle is Gold Disk's *Office* – and while there's nothing wrong with it, *Office* cannot claim to be truly integrated. Just for the record, it contains a neat little word processor, mediocre flat-file database, simple desktop publisher and a first rate spreadsheet.

What is the advantage of an integrated system over a bundled one?

Mainly the common interface. This helps you get to grips with each module faster because once you master one, you will be well on the way to mastering the others. In business anything that makes things easier has got to be a good thing.

So are there any disadvantages then?

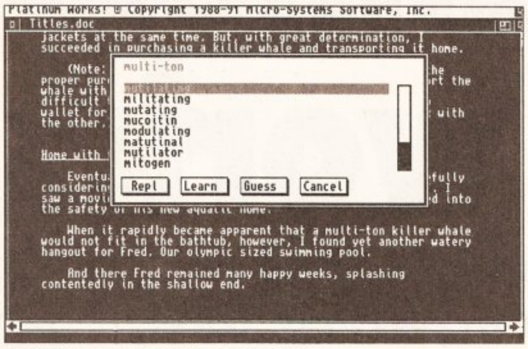
As we say in *Amiga Shopper*, "yer gets what yer pays for." Face it, no-one buys a Skoda Estelle and expects it to go like a Porsche 944. More or less the same situation applies to integrated software like *Mini Office* and *The Works*.

With the budget package, you can expect to get reasonable performance but possibly a high level of inter-module self-reliant integration. (That's just a fancy way of saying, how well the modules exchange data with other systems). The higher priced system will be much less reliant on data from itself and more relaxed about the formats it can read.

Bundled software can be something of a mixed bag in this respect. For instance, some modules might be able to read and write ASCII data while others only accept their own formats. There is nothing wrong with this, but it can limit the usefulness of some modules or just make them harder to use.

On the upside, getting a bundle may be a good way of obtaining something you badly need with some supplementary software you can use if the need arises. The strength of Gold Disk's *Office* bundle is the *Advantage* spreadsheet.

you. (MSS produces *Excellence!* which does that job). As a word processing engine for bashing out lots of text it's ideal – and simple IFF graphics can be inserted at print time.



The *Scribble* spell checker comes adrift when it attempts to guess what it was you meant to type...

One particular drawback is that the size of any document is limited by the available memory and *Scribble* does not offer any facility to automatically link multiple documents; this should not pose any major problems for most users though. *The Mini Office* word processor has a simpler, more graphical front end but *Scribble* is faster in general and the spelling and thesaurus sections are better.

The 80,000 word spelling checker is based on a Collins UK English dictionary. It is, however, less than good at guessing what you meant to say. In comparison, the thesaurus is in a different league, not only does it give the synonyms for a word, but also the type of word: noun, adjective, adverb and so on – as defined by the headword.

One thing which is worth mentioning is the slightly eccentric way in which *Scribble* performs cut and paste (editing) operations. Most word processors use a drag selection procedure – in which you hold the left mouse button and move the mouse over a rectangular area of text. *Scribble* works in much the same way only each operation – cut, paste, copy – activates a special mode, shown by the mouse pointer. This will be a little alien for experts who will more likely be used to selecting text first, then the operation. In practice though, *Scribble*'s method is simple and perfectly usable; dare I say better?

DATABASE

The database module was also sold separately under the *Organise!* banner. Although a relatively simple flat-file affair, MSS claims it will handle up to 128 fields with 4.2 billion records – and it's file compatible with Ashton-Tate's multi-cloned *DBase III*.

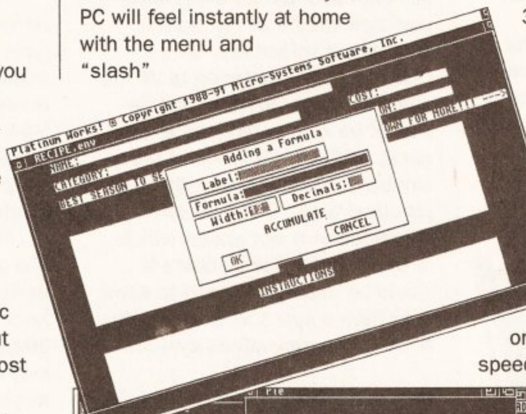
Four field types are supported: text, numeric, date and logical. Text fields can be up to 254 characters wide and numeric ones support 16 digits including the decimal point. Numeric fields support basic calculations including exponentiation and parenthesis; and another field name can be used as a variable (like the spreadsheet). Enthusiasts can use many of the spreadsheet functions within fields too.

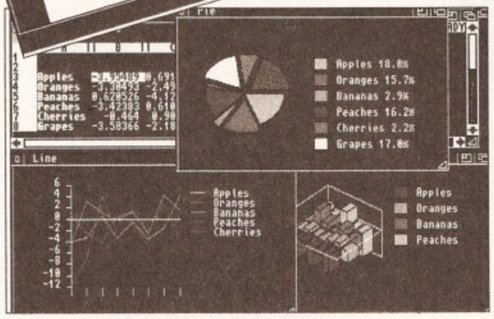
Reporting facilities are more basic than power databases such as *Superbase Personal 2*, but quite adequate for most users. Similarly, the mail-merge is simple but does the job. Frankly, few people need more power or features than this – and those who do should buy a custom package such as *Superbase Professional*. Among flat-file databases though, this one is a real star.

SPREADSHEET

The shining star in *The Works* is its spreadsheet, also known in another guise as *Analyse!*.

Users familiar with systems such as *Lotus 1-2-3* and *As-Easy-As* on the PC will feel instantly at home with the menu and "slash" command interface. In fact, *Analyse* will read and write the dated, but widely used, WKS format developed by Lotus for its spreadsheets. This takes it at least one step ahead of its closest competitor *Mini Office* which doesn't recognise the WKS format. Just 40 functions put it well behind major spreadsheets, but the most useful ones are included – besides, enterprising users can soon construct their own.





Above: the database module is a breeze to get to grips with

Below: the spreadsheet module. Data can be cut and pasted from other modules for graphics

The spreadsheet module incorporates the graphics facilities – which as you may remember are a separate entity in *Mini Office*. This might seem limiting, but data can be cut from another module and pasted directly into the spreadsheet for graphics. This approach is more conventional than the stance taken by *Mini Office*, and works very well on other systems such as the Macintosh. There is no overall advantage to either method, they are merely different sides of the same coin.

What makes the spreadsheet so powerful is its extensive macro language. In essence, any slash command that can be entered at the keyboard can be programmed as a macro call. A special macro (/0) is automatically executed as the sheet is opened making it useful for presentations and rolling demonstrations.

COMMUNICATIONS

The telecommunications module is in a class of its own – not least because it offers speeds from 300 to a claimed maximum of 57,600 baud! Generally speaking the Amiga's hardware is only good up to 19,200 and it gets a bit gribbly at those speeds unless you use hardware handshaking. (See our regular comms column by Phil Harris for more information).

So much for the blurb on the box. Anyone can claim speeds few people will ever use – but the Comms module is no toy. It offers a 40 number dialling directory, programmable macro keys (20 per number) plus all the common transfer protocols: X, Y, WX and ZModem plus Compuserve B, Kermit and SADIE™ – MSS's proprietary transfer protocol. ZModem is an essential if you use any serious BBS like CIX for instance. Emulations include 8-colour ANSI, VT52, 100, 102 and Tektronics 4010 – but does anyone still need some of these, I wonder?

A full macro (scripting) language is included so you can automate long log-on sequences. The package can even be programmed to log you on to a remote system, download all your mail, messages and so on and log you off. A special delay function can be used to time the logon to activate at some specific time – while you are out, away on holiday or even asleep; dates are not supported though.

CONCLUSION

The Works has been around for quite some time now – but it still makes a very fair showing against even recent competition. Overall the modules are slicker than *Mini Office* and generally offer more and better features; this is, of course, reflected by the higher price.

Insofar as the front-end is concerned, *The Works* looks rather dated but this should not be seen as a disadvantage – it is still clean, clear and it does the job. Many users will probably prefer this approach to the more flowery, 3D bas-relief in vogue at the moment. Although less attractive, the spartan look is faster to draw – and that means the programs can perform better. In summing up, I can only say, love it or hate it, *The Works* is a classic which simply cannot be passed over as being past its sell-by date. *Mini Office* is pretty and cheap, *The Works* is more powerful and means business – let battle commence. AS

SHOPPING LIST

The Works Platinum £79.95
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CHECKOUT
THE WORKS PLATINUM

Ease of Use ●●●●○
The spreadsheet module, like most, is heavy going at first.

Interface ●●●○○
Looks very dated, but it works well.

Documentation ●●●●○
Brilliant and plenty of it – installation even details popular hard disks. Not quite up to date with the program though.

Price Value ●●●●○
Extra features make it worth the extra 20 quid over *Mini Office* if you can afford it.

Overall rating ●●●●●
Quite superb – a true Amiga classic.

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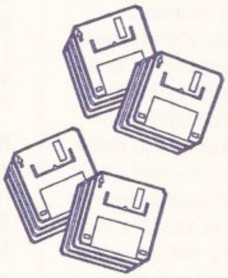
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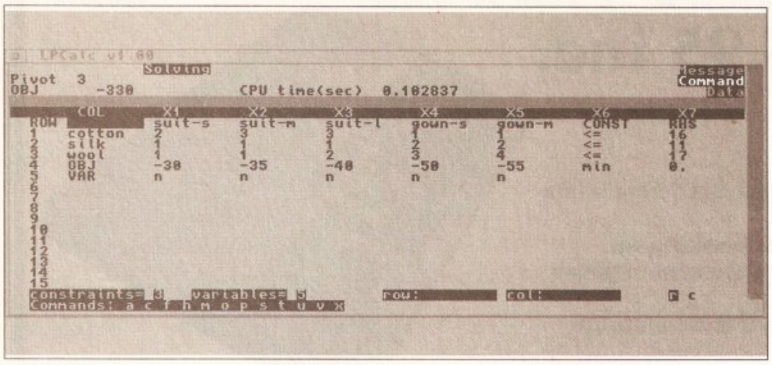
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Access



Is *LPCalc* really the future of spreadsheets and databases?

LPCALC

Solid Gold Software makes some bold claims for LPCalc – Mark Smiddy asks whether it really is a universal business panacea

The blurb on the back of the packaging grandly proclaims that *LPCalc* is: "Beyond spreadsheets! Beyond databases! The next generation of productivity software..." Typical applications listed for *LPCalc* include: production scheduling; portfolio selection; hospital diets and even tactical planning. For those into "buzz" it sounds like the final solution – certainly such phraseology is guaranteed to bore the pants off interesting guests at parties – but what does it all mean?

LPCalc is a linear programming calculator. A what? I'd never heard of such a thing either – and considering most of my computer literate colleagues also shrugged shoulders, I decided *LPCalc* had to be worth closer investigation. To quote the manual, "There is no more powerful programming tool available on any machine at any price". Oh dear, sounds as if someone has been free basing hype.

LPCALC ON TEST

Shaken but undeterred, I booted the package which promptly crashed the machine. Solid Gold says *LPCalc* requires 1Mb (it even comes with a special A3000 version), but, try as I might, only the 512K version worked on my 3Mb A500 Plus. Now then, where is that "friendly graphical user interface" mentioned in the manual? Come to that, where are the menus? There aren't any! Let's get down to some basics: *LPCalc* does not have any menus and the nearest thing it has is a list of one letter commands. It does not understand the mouse – and although the cursor keys work some of the time, "Enter" on the numeric keypad does not.

If Solid Gold defines this sort of front end as friendly I would hate to be on its Christmas card list.

> *"Masochists with a penchant for linear programming will enjoy this..."*

CALCULATION

So what is this linear programming stuff all about? Well the idea is to define a problem as a set of constraints (limits if you like) and their control plus the variables the decision will be based upon. *LPCalc* then uses these to work out a solution for the problem using a linear algorithm.

Instantly you can see the problem: business people want a computer to do all the work – that, after all, is what they are there for. However, although linear programming does require a lot more thought than a spreadsheet it can solve some interesting problems once they have been defined.

It's no accident that *LPCalc* looks like a spreadsheet – it was designed that way. Theoretically that should make it a lot easier to use – but that is only part of the problem. *LPCalc* does not understand even basic point-and-click methods, so the spreadsheet-like look and feel boils down to something horribly reminiscent of an ancient PC application.

CALCULATING DECISION

A simple example in the manual quotes a tailor who is making suits in three different sizes, and gowns in two others. Each garment makes a specific requirement on materials. For instance: a medium sized suit requires one square yard of silk, one of wool and three of cotton. These values (and the amount of each in storage) form the constraints.

The decision variables are the types of clothing – there's five in this example – and each one determines a set of three constraints. The types of constraints are set up as: limitation (<=); exact requirement (=); and equal to or greater than (=>). Variables in the RHS (right hand side) column set the limits for those.

COST ANALYSIS

The objective coefficient in this problem is defined as the cost of each garment and appears below each type in the OBJ row. The final objective appears below the constraints in the CONST column and is the maximum number of garments to create in order to get the most profit from the current inventory. Enough of that, see the screenshot for a complete example.

The calculation is completed in under a second – and a few button pushes later, you can examine the results, but the units have to be defined separately (a tediously slow job) so they are meaningless at this stage. Once done though, *LPCalc* does some of the work defining the units-per-whatever. For this example, materials can be examined in pounds-per-square yard. More interestingly, it will also provide further information. The best profit available from this data set is £330 by making two small suits, three large suits and three small gowns. It can even provide the break-even prices for the individual materials, how much will be left over and so on.

What use is all this information? Quite a lot if you have the slightest idea of how to define and use linear equations – non-whatsoever if you don't.

Solid Gold has missed a golden opportunity here by assuming the whole world knows everything there is to know about linear programming. The truth is, most people do not. A detailed description of the theory behind linear programming – written in plain English – and a comprehensive glossary of terms must be added to the manual. Also, the shocking front end needs major improvements.

CONCLUSION

LPCalc is without doubt one of the worst programs I have ever seen on the Amiga. If it were an ancient PD or shareware release I could have some sympathy, but people are being charged money for what amounts to a relatively recent program. I cannot claim to be so much as a neophyte at linear programming, but despite experience programming real applications in languages such as C, ARexx, several versions of BASIC and assembly code I could not get my teeth into *LPCalc*.

Masochists with a penchant for linear programming will enjoy this, everyone else should leave it well alone. Think of the current incarnation as "work in progress" because with a much better manual and greatly improved front end to complement the impressive linear programming engine, *LPCalc* could be incredibly useful. AS

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LPCalc £49.70
by Solid Gold Software
116 Parway Drive
Arlington Park
Huntingdon, W Va 25705

Distributed in UK by:
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Poyle 14, Newlands Drive,
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CHECKOUT LPCALC

Speed ●●●●○
Very fast at what it does.

Interface ●○○○○
Appaling to look at and very difficult to use.

Documentation ●○○○○
Poor layout and far too "clever" for its own good.

Price Value ●●●○○
Cheap enough if you have a use for it.

Overall rating ●○○○○
Useless, unless you already know how to use it.

AMIGA PERIPHERALS

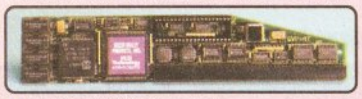
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A530


HD8+

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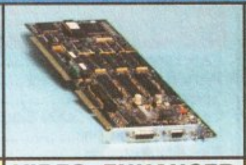


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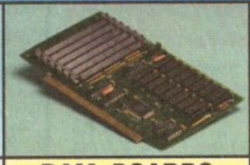


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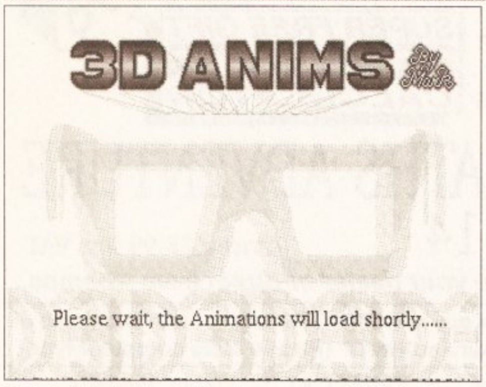
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Have you been sending in examples of your work? Wilf Rees looks over your offerings – and tries out Art Tutor from Castlesoft

WORK WORK WORK WORK RK WORK WORK WORK WO — All your own



This is Mark Evan's loader screen which looks great through the 3D glasses he provided

The time has come to collect together some of the various pieces of work I have been sent and show you all how well the Amiga is being used to develop ideas and solutions to educational tasks.

Please don't feel upset if your own offering isn't among the examples used this month. I have lots to work from, and It may well emerge in the future. Do remember, we are looking to publish examples of good working practice using an Amiga. If you have produced something that you are pleased with, discovered a short-cut to achieve a special effect, or carried out an assignment at school – send it to me at *Amiga Shopper.* If we like it, you get international coverage in the best Amiga mag, not to mention the chance of something nice arriving by post. So, keep sending 'em in and don't be shy.

I particularly liked the way some people really had a go at the 3D article I wrote, and we received some super examples. Of all the work I received on this, there is one particular collection of animations I felt captured the whole principle very well, and I have decided to give this pride of place. Mark Evans from down there in Neath has obviously spent hours glued to his Amiga (and has read the article carefully), because his results were very good. Not only were the animations well constructed, but the whole disk was put together with a great deal of thought. It had a header page which also animated in 3D: the Commodore logo spins on a horizontal axis, while the digits '500' turn on their vertical axes.



Mark's Commodore logo spins on a horizontal axis while the '500' spins on the vertical axis

BLOOD AND THUNDER

The graphic design in one of Mark's pieces looks like the ideal back cover for a record sleeve, and the animation going on around the graphics bears the usual blood, thunder and spookiness we all know and love. The smoke billowing out from the main character is as nice an effect as I have seen, and the distance effect from offset tints works well. I also liked the loader screen which was a 3D still, showing a pair of glasses (see above left).

TUNNEL VISION

The best and most effective piece of 3D work however, was an animation on Marks' disk called Tunnel.

This really did make your eyes seem to be drawn down a rotating, shifting tunnel, and the amount of illusionary depth created on the monitor screen was truly amazing! A well presented and carefully constructed piece of work, Mark, well done! A special goodie is on its way courtesy of Commodore UK.

Mark also pointed out that he found the 3D effect varied according to the ambient lighting, as well as the levels of brightness and contrast on his monitor. So, if you're still struggling with the effect, try fiddling with the knobs on the monitor, it might suddenly come good.

AMIGAS IN ACTION

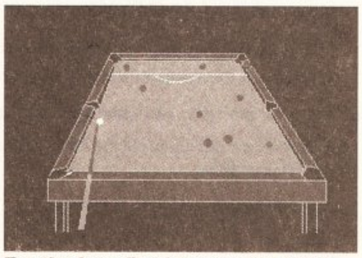
What a real pleasure it was for me to receive a disk from David Parks who teaches Art & Design at Woodhouse High School in Tamworth.

Obviously the old Amigas are being given some hammer both in lessons and in the Computer Graphics club held after school. David's disk contained loads of work from students at the school, mostly in year nine (aged between 13 and 14). The students put together collections of their work from the school, together with educational PD programs from the open market, and sell the disks at £1 each. Along with the disks came some useful pointers from David.

Again in connection with *DPaint*



Mark Allen uses a nice colour cycling routine to get this effect



For the benefit of those with black and white TVs, the yellow is behind the pink – thank you, Dean Cobb

MAKING A LIGHTBOX ON DPAINT III

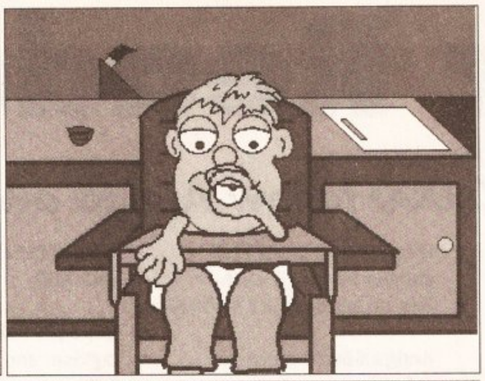
Keith Brogan from Livingston, West Lothian, sent me this great tip for creating a lightbox in *DPaint III* – a feature previously only available to *DPaint IV* users. He uses the animation feature, linked to the brush and grid...

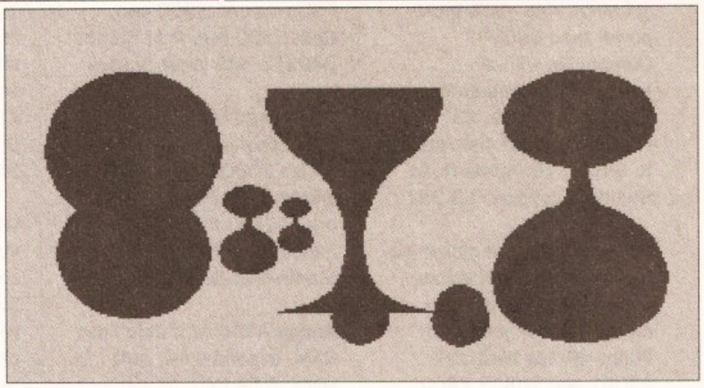
1 Create a number of animation frames (number dependant on application)
2 Draw an image on frame 1 (do a squiggle for practice)
3 Turn on 'grid' (press 'G')
4 Pick up image as brush with left mouse button.
5 Position brush exactly over image on screen
6 Go to frame 2 (press 2). Stamp on brush (check alignment by pressing 1,2)
7 Bring up stencil requester (shift+tilde) click on background colour – OK
8 Turn the grid off
9 Draw a rectangle in a different colour over image on frame 2
10 Free Stencil and fix background
11 Using colour from frame image 1, draw changes on frame 2
12 Free background and call up stencil requester
13 Select background colour and colour used for frame 1
14 Select filled rectangle tool
15 Draw over image on frame 2 holding down *right* mouse button
16 Free Stencil

This process should give you two different images on frame 1 and 2 All you have to do is repeat the process for successive frames.

Keith admits that this might seem a little tedious at first, but adroit use of keyboard short-cuts, and familiarity with the method greatly speeds up the process. A really useful routine, Keith, prezzie on its way!







Above: another example of Mark Evan's work – and the smoke effect works well
Top right: Neil Cooper provides a nice animation of a well-known lager advertisement
Right: David Perks has drawn these wine glasses, then converted them into scaled animations pivoting on the horizontal axis

III and *DPaint IV* – to avoid the problem of having to wait while the computer prints out your work, use your Amiga's multi-tasking capabilities and load *DPaint* twice, working on one *DPaint* document while the other is printing. Obviously with *DPaint IV* this is not possible because the program takes up too much memory. However, a utility in the public domain called *PPshow* will permit this. It is executed by using the 'P' key, and can be pulled down to continue working on *DPaint IV*. The program is also small enough to be fitted on to the *DPaint IV* disk.

WOODHOUSE SCHOOL

There were four animations on the Woodhouse disk, all of which deserve commendation. I particularly liked David Perks' animated wine glasses which rotated around the horizontal axis. Sorry to change the colours slightly David, but in order to display the frame grab at its best, I needed to alter it for printing in black and white.

Meanwhile Neil Cooper produced a lager lout advert for a well known swill, which has a nice cartoon quality, and ran smoothly; Dean Cobb gave us the Jimmy White treatment with a nifty snooker animation, and Mark Allen tackled the *Terminator 2* scene with a crisp colour cycling routine. Well done boys, but where are the girls?!

EXTENDING THE INTEGREX

Woodhouse High School also has Integrex 132 colour printers, which I have referred to previously, and David Parks suggests two further applications possible with the Integrex. The first involves taping thin cotton to a piece of A4 paper, and passing this through the machine, thus transferring the image on to fabric. I know from my own experience that this does work, but caution is due, because when I spoke to Integrex about this some four years ago, it strongly advised against it because of possible damage to the ink-Jet head. This does seem ironic, as Integrex recently announced fabric ink cartridges for the Integrex, albeit, for printing on to paper, then transferring to fabric by hot iron.

OFFSET PRINTING?

David's other suggestion, which is new to me, involves printing on to silver paper or aluminium foil. The image can then be transferred to another surface by a process similar to offset printing. This enables the transfer of images on to surfaces which could not normally go through the Integrex.

Incidentally, while on the subject of Integrex printers, a new range is due out very soon, and the new Bubble-jet (called the Beta-jet and which just happens to be sitting in front of me), is a superb piece of kit, at a very competitive price, which produces almost laser quality printing. Keep watching this space for the first ever review... AS

ART Tutor

Having taught Art & Design for more years than I care to remember, I was interested to see how Castlesoft approached the subject.

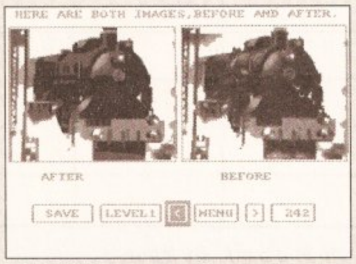
Art Tutor requires Workbench to be loaded first. The program disk is essentially divided into 2 sections: Art Tutor 1, and Art Tutor 2. I'm not really sure of the logic in dividing the package up into two sections, it really was annoying having to quit one section, then reload another, when moving between the various elements would have been much preferable. I strongly suspect this may be due to the program being ported from the ST, as the manual missed out on some of the porting, and refers to Atari art packages. The subdivisions of art categories are fairly comprehensive, covering such aspects as design, cartoons, perspective, landscape, colour, head & face and so on – 11 topics in all.



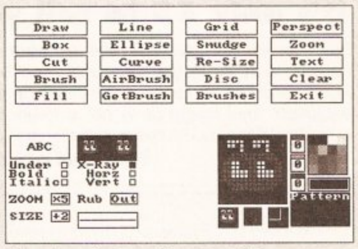
Cut & Paste: these are really nasty digitised facial features and not a patch on the *DPaint* version

Common to each of the two tutorials is a fairly rudimentary art drawing package, referred to as 'Level One'. This offers the usual menu driven tool facilities for geometric and free line drawing, along with a simple sprite designer. Each of the categories goes through an example to explain the principle or method advised to follow. Some of these are visually well-handled, and make full use of the Amiga's abilities. I did find that there was often rather a large leap from the early developmental stages of a topic, to a suddenly completed image, with no advice given as to the method adopted. All of the basic principles any drawing and painting teacher handles are present, and in some cases, done rather well. But my real reservation is that this package is 'canned art'.

Working and using computers continually for not only Art & Design, but many other disciplines, I am only too aware of their capabilities and limitations. The manual in this package attempts to extend the learning experience beyond the limits of the package itself, and recommends further exercises. Commendable enough, but there is no substitute for developing visual literacy to replace observed drawing, and while I accept there will be areas of understanding enhanced by the acquisition of this package, it addresses only those skills associated with 'effective' learning at the cost of 'affective' and appreciative understanding. *Art Tutor* has too much of a feel of those partwork magazines, which build up to make one an 'expert' in a particular field. I suppose it might serve to improve the skills of someone who lacked any art education, but I have to say that, as a practising teacher, I wouldn't have it near my classroom.



Anti-aliasing, smoothing and blending are all possible with *Art Tutor*, but so what? Sadly it's all been done much better elsewhere



The drawing package which supports *Art Tutor*. Rudimentary and certainly not one I'd like my students to develop their skills on

SHOPPING LIST

Art Tutor £29.00

Available from:
Castlesoft
☎ 0333 21243

Shopper Reader Ads

... Or how you can reach 50,000 fellow Amiga owners for only a fiver

WANTED

Swap your Amiga PD disks for mine. Over 1000 disks to choose from, all virus free. Send your PD list to Harry Hutchinson, 53 Cumberland Rd, Loughborough, Leics LE11 ODE

FOR SALE

Laser quality prints, send disks with SAE stating details of picture to P Garrett, Chestnut Cottage, White Lion Road, Amersham, Bucks HP7 9JR. One print £1.50, four prints £3!

A1500+ ECS, ROM sharer, Nexus SCSI card plus 4Mb and 5 port MIDI interface fitted internally. Also track ball mouse (never used) and two joysticks plus all manuals. £600 ono. For details contact Alan ☎ 0474 832861

Amiga 2000 GVPII 52Mb, 5Mb RAM, Kickstart 2.04, Philips CM8833 monitor, four joysticks, loads of games, DPaint IV, Aegis sound sampler, lots of PD, software £1000 ono ☎ 081 946 3256 Ask for Mr Clarke

Accelerator accelerator accelerator SSL A5000 plus. 20MHz 68020, 1Mb Fast 32-bit DRAM. A500 and A2000 compatible. £250 ono. £320 with 68882 25MHz co-processor. ☎ Chris 0203 713690

Amiga 2000 system. Only 7 months old. This is a full set up and too big to list. Will not split. Cost £6000, sell £3200. ☎ Gazza on Rochdale 0706 44858

Amiga software – Birds of Prey £30, World Class Rugby (unused), Devpac 1, Power Basic £25 each (boxed). Lemmings, Double Dragon II, Alcatraz, F16 combat pilot £10 each. ☎ Ken on Leeds 0532 698432

Amiga 68010 processor (10MHz) 30% - 50% more power than 68000. Compatible with all hardware/serious software. Plus most games. £37.50. For details send disk/stamp to S Barr, 16 Ogilvie Road, Stirling, Scotland FK8 2HJ

Amiga A590 hard disk drive as new in box with mains and software. £180 ono. Amiga 2000 ☎ meg twin floppy 40meg hard disk A2091 and 10845 £800. ☎ 0942 819786 Ask for Paul Kelly

Dr T 'Copyist DTP' music notation software. Latest version. Full MIDI transcription facilities. Ideal for KCS etc. Epson, deskjet, postscript drivers. Zone registered. Cost £230, accept £150 ☎ Robin 0453 842 469

Superpic real time colour digitiser and genlock. C/W PSU manual. £300 ono. Cost £500 new ☎ M Bowles 040377 545 West Sussex

CSA Mega Midget racer 33 MHz accelerator card for the Amiga 2000/1500, 512K SRAM, 2Mb DRAM. £490 ono. A2320 display enhancer board £175 ono. ☎ A Martin 081 863 1386 eves

Amiga A500 with 2Mb Fast RAM, second drive, software, 4.5A PSU, MacII cartridge £300 ono. 640K Hercules display PC – offers up to £150. Will consider splitting or swaps. ☎ Gary on Crawley 0293 520199

Megachip 2Mb of Chip RAM. Brand new, in box. Unregistered, fits in A500/1500/2000. Upgrade forces sale. £110 A500 Plus. 1Mb chip upgrade £25. Cheap? ☎ Chris 0703 431168

Amiga 68010 processor 10MHz 30 - 50% more power than 68000. Compatible with all serious hardware/software. Plus most games £37.50. Details send stamp. S Barr, 16 Ogilvie Road, Stirling, Scotland FK8 2HJ

Citizen 224 with colour kit fitted, 4 months old, 2000 continuous paper £200. DPaint III £20, Platinum Works £30. all with manuals and original disks. ☎ Keith Sargent 081 472 1403

XT bridgeboard with 51/4" drive, software and manuals for A1500, A2000. £130. Installed if local to Newport. ☎ Mike 0633 875034 eves

82Mb autobooting HD with Spirit controller card for A1500/2000, £220 ono. Also Microbotics 8-up RAM expansion board populated to 2Mb, £100. ☎ Paul/Brian 0634 848261 after 7pm

A1500 Quantum 40Mb HD, 4Mb RAM, GVP 68030 Combo, Philips 8833/2 monitor, Sharp JX100 colour scanner, plus software. Cost £3000. Sell £1600. ☎ A Haughty 0633 881051 eves

Power computing dual floppy drives with PSU, boxed, top condition £75 ono. Kindwords v2 word processor £20 ono. ☎ Paul Cox 0256 475406

Amiga 1500. Unwanted present. 1 month old, includes Workbench 2, DPaint 3, 1Mb, two disk drives, Extras, mouse modulator. Fully boxed, perfect condition. Cost £700, sell for £550. ☎ Simon 091 2515218

8Mb Power Computing RAM board for A500/Plus. Populated 2Mb. Fully auto config. Less than 6 months old. £90 ono. ☎ Trenton 025887 398 after 6pm

It's only £5 to sell your used hardware and software in Amiga Shopper

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Issue 19

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16-32 Micro Programming AMOS, bimonthly fanzine, PD, (Fish->590) Membership 100FF/ £10 Contact F Moreau, 132 rue Jean Follain, 50000 Saint-Lo, France ☎ 31 52 20 02

Amiga Addicts Newsletter and open nights For info SAE to A Minnock, Clonkelly, Binn, Co Offaly, Ireland.

Amiga Artists Club 34 Roundhay Mount, Leeds LS8 4DW. For Amiga artists, musicians and coders. Pirates not welcome. Free. ☎ KAM on 0532 493942, 5-8pm

AmigaBASIC club Free bi-monthly disk, help for beginners and experts. Membership £10/year. Contact Conran Ahmad, 15 Weybridge Rd, Thornton Heath, Surrey CR7 7LN ☎ 081 689 9102

Amiga Beginners' Club 110 Whitehill Park, Limavidy, Co. Londonderry BT49 0QG. Club to help newcomers. Bi-monthly club disk, and a small PD library. Membership £2 for a single disk, or £20 for every issue

Amiga Computer Club PD Library, graphics, video, DTP, monthly mag SAE for details to R McDonald, 3 Islay Court, Irvine KA11 4JQ

Amiga help club Contact John Kewley, Derlwyn, New St, Bethel, Nr C'von, Gwynedd, LL57 1YW. Meetings Mondays 7 – 10pm. Graphics, sound, Workbench, programming, help on any topic. Beginners welcome. Free membership

Amiga Helpline Contact Gordon Keenan, 21 Skirsa Place, Glasgow G23 5EE. Software/hardware help service, free PD, DTP problems sorted, plus general Amiga chit-chat. Send a stamp for full details. Membership £15/year

Amiga Mania For details contact D Cryer, 88 Blackbull Rd, Folkestone, Kent CT19 5QS

Amiga Musicians' Club Membership gets you a disk with 50 IFF samples a month for 12 months. Also sample service. Membership £30. Contact Gavin Wylie, Guthrie Street, Carnoustie, Angus

Amiga Navigation Contact Dave Thomas 4a, Allister St, Neath, W Glamorgan. PD, advice, even small repairs and social evenings. Weds 7 – 9pm. Membership £10/year

Amiga Network International 2 monthly club disk, reviews, advice. For info contact Phil or Steve: 434 Denby Dale Rd East, Wakefield, W Yorks WF4 3AE

Amiga PD Oliver MacDonald at Tunley, Albaston, Gunnislake, Cornwall, PL18 9EL. Small but friendly PD Library, 99p a disk. Distribute your own written PD. Send £1.50 for catalogue disk

Amiga PD Exchange at 27 Spa Rd, Preston, Lancashire, PR1 8SL. Chance to exchange PD, shareware, Fish and Tbag disks. £1 for disk and membership

Amiga Users' Klub, Windsor House, 19 Castle St, Bodmin, Cornwall PL31 2DX. Meets every Friday from 6.30-9pm, to expand members' knowledge of Amiga and to help solve people's problems. Contact Jack Talling

Amiga User Group – FYLDE Contact Andy Wilkinson ☎ 0253 724607 25 Glen Eldon Rd, Lytham St Annes, Lancashire FY8 2AX. Meetings twice a month, newsdisk, tuition, technical support, Amiga advice Membership £15/year

Amiga Users club Contact Edward Metcalfe ☎ 021 7441430 49 Burman Rd, Shirley, Solihull, W Midlands B90 2BG PD swapping, games swapping (not copying), competitions, free membership

Amiga Video Producers' Group Meets quarterly in Swindon. For info SAE to J Strutton, 8 Rochford Cl, Grange Park, Swindon, Wilts SN5 6AB ☎ 0793 870667

Amiga Witham Users' Group 85 Highfields Rd, Witham, Essex CM8 1LW. Tips and Basic programs. K Anderson ☎ 0376 518271

Amigaholics Club Free membership. Own disk magazine. For further information contact Kevin Bryan ☎ 071-580 2000 Ext 240 or write to 29 Wolfe Cres, Charlton, London SE7 8TS

Amigamania Bi-monthly newsletter (tips, advice etc), quality PD, discount hardware, software and accessories, free advice. Discount card for High St shops. Annual membership fee £10. Contact S Green, 9 St Lukes Walk, Hawkinge, Kent CT18 7EF

Amos Programmer Club Free membership, swap AMOS programs and PD, disk magazine and help for new users. Contact Gareth Downes-Powell, 6 Brassey Avenue, Broadstairs, Kent CT10 2DS

AMOS Programmers' Exchange Free membership. Swapping software and ideas. Help available. J Lanng, 7 Majestic Rd, Hatch Warren, Basingstoke, Hants RG22 4XD

Amos Programmers Group John Mullen at 62 Lonssdale St, Workington, Cumbria CA14 2YD. Programming hints, tips, tutorials plus several others. SAE for info. £10 membership for bi-monthly disk mag

Angus Amiga CDTV club Contact J Robertson, 22a High St, Brechin, Angus DD9 6ER ☎ 0356 623072. Review software, discuss anything Amiga. Free membership

Astro PD Send SAE and blank disk for catalogue. Help and advice also available. Contact D Benson, 3 Skiddaw Court, Nunthorpe, Middlesborough, Cleveland TS7 0RD

Avon Micro Computer Club Graphics and animation, business and the chance to speak to professional users. £3 per annum. Contact Roger: 95 Downend Rd, Horfield, Bristol ☎ 0272 513224

Basic Programmers' Group 68 Queen Elizabeth Dr, Normanton, West Yorks WF6 1JF. Encourages the use of Basic, exchanges ideas and assists beginners to the language. Free newsletter Mark Blackall ☎ 0924 892106

Beaconsfield and district CC Contact Philip Lishman ☎ 0494 782298 27 Russell Court, Chesham, Bucks. Meetings at St Michaels Hall, St Michaels Green, Beaconsfield 7.45 – 9.45pm. Programming, gaming swapping PD, having fun. Membership £20/pa; £10/6 months

Bloomfield video and computing Contact Mrs Beryl Hughes ☎ 0267 2357522 Nashville, 50 Glynderi, Carmarthen, Dyfed SA31 2EX. Meetings at the Bloomfield Community Centre, 7.30pm alternate Tuesdays. Amiga for beginners, video techniques etc. Membership £5

BR & CJ Computer Club B Robinson at 23 Fairway Rd, Shepshed, Loughborough, Leicestershire, LE12 9DS ☎ 0392 72889 or 03922 841296. Regular disk mag packed with tips, reviews of games and serious software, game cheats database, demos and utils, very large PD library. Membership fee £1.25

Camberley User Group Lectures, competitions, advice, meetings, free membership. For more info contact F Wellbelove ☎ 0252 871 545

Champion PD Club PD at 30p, newsletters, advice, help and more. Membership £10. Contact Steve Pickett, 31 Somerset Close, Catterick, N Yorkshire, DL9 3HE

Chester-le-Street 16-Bit Computer Club Ground floor function suite, The Civic Centre, Newcastle Rd, Chester-le-Street. Meets Mondays from 7.30-9.30pm. Exchange advice and swap tips. ☎ Peter Mears 091 385 2939

GET YOURSELF LISTED

If you run a user group which isn't listed on this page, fill in the form below for your free entry. Send it to *Amiga Shopper* User Groups List, 30 Monmouth Street, Bath BA1 2BW. We reserve the right to refuse entries.

AS19

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Place of meetings ....

Time of meetings ....

Type of activities ....

....

Membership fee ....

CDTV Users Club Swap views on software and hardware. Contact Julian Lavanini, 113 Fouracres Rd, Newall Green, Manchester M23 8ES

Chic Computer Club Full details with an SAE to STAMP, Chic Computer Club, PO Box 121, Gerrards Cross, Bucks. Contact Steve Winter ☎ 0753 884473

Club Amiga £10 a year for PD and a 24-hr helpline service (091-385 2627). For more info send SAE to Chris Longley, 5 Bowes Lea, Shiney Row, Houghton Le Spring, Tyne and Wear

Club Futura Advice to programmers and beginners. Send SAE for info to G Holland, 16 Hermiston, Monkseaton, Whitley Bay, Tyne & Wear NE25 9AN

Comp-U-Pal Australian group for users in the outback. Newsletter, helpline, PD library. Membership A$24. Comp-U-Pal, c/o MDA, PO Box 29, Knoxfield 3180, Victoria, Australia

Computeque Steve Lalley at Inskip Meeting Hall, Ashurst, Skelmersdale, Lancs on 0695 31378 7.45pm – 10.30 pm every Tuesday. From beginner to advanced user. Half year membership £2.50 children, £3 adults

Computer Club 16 Laton Rd, Hastings, East Sussex ☎ 0424 421480. A 16-bit club dedicated to being computer enthusiasts Membership costs £15 per year

Deluxe Cheats Disk User Group Steven Frew at 96 Campden Green, Solihull, West Midlands, B92 8HG. Software advice. Updates every 2 months! £4 for disk £2 for updates

Edinburgh Amiga Group Membership £5, includes free advice and PD. Contact Neil McRea, 37 Kingsknowe Road North, Edinburgh EH14 2DE with SAE

Enfield Amiga club Contact Sean Clifton ☎ 081 8042867 32a Hoe Lane, Enfield, Middx Meet, swap, competitions, helping new users with problems

Exeter 16 Bit User Group Andrew Deeley or Phil Treby at 25A Gloucestershire Rd, Exwick, Exeter, EX4 2EF. Meeting every Wednesday 7pm. Programming £6 per annum

Galactik PD Contact 10 Crugan Ave, Kinmel Bay, Clwyd LL18 5DG. Demos, music, utilities, games, £1.50 for catalogue disk

GFA Basic Forum Contact J Findlay ☎ 0788 891197 or send SAE to 52 Church Rd, Braunston, Nr Daventry Northants NN11 7HQ. Free advice on programming in GFA. Also tutorial disk for sale. Beginners and advanced users welcome. Free membership

Guru Masters PD, demos etc, contact the Sheriff, 111 Sherbourne Rd, Banbury, Wolverhampton, WV10 9EU ☎ 0902 782277

Hampshire PD Club Mike Gallienne at 79, Carless Cl, Rownes, Gosport, Hants, PO13 9PW on 0705 585323. Public Domain Disks at 35p. Competitions once a month. Send an SAE for more info to the above address. £10 a year

Hereford Amiga Group Membership free, help, exchange of PD and shareware. Lotus Turbo 2 Quad Player Championship. Contact John Macdonald, Alma Cottage, Allensmore, Hereford HR2 9AT ☎ 0981 21414

Hornesoft PD Amiga PD from 20p to 69p. Send SAE and disk for catalogue. Contact 23 Stanwell Cl, Wincobank, Sheffield S9 1PZ

In Touch Amiga Penpals, contacts, PD, swaps £2.50/year. For more information contact P Allen, 0342 835530, PO Box 21, Lingfield, Surrey RH7 6YJ

Independent Commodore Products Users' Group Biggin Hill Library, Church Rd, Biggin Hill, Kent. Meets most Thursdays from 7.45-9.45pm. Lectures and open nights. ☎ John Bickerstaff after 8.30pm 081-651 5436. Also national network of user groups. Contact individual groups for details on activities, cost, meetings etc:
Andover ☎ R Geere 0264 790003
Anglesey ☎ N Massey 0407 765221
Coventry ☎ W Light 0203 413511
Dublin ☎ G Reeves 010 353 12 883863
Leeds ☎ R Eyre 0532 487691
Macclesfield ☎ P Richardson 0298 23644
Merseyside ☎ G Titherington 051 521 2553
Mid Thames ☎ M Hatt 0753 645728
S Wales ICPUG ☎ I Kelly 0222 513815
Solent ☎ A Dimmer 0705 254969
SouthWest ☎ P Miles 0297 60339
Stevenage ☎ B Grainger 0438 727925
Watford ☎ B Rigby 0923 264510
W Riding ☎ K Morton 0532 537318
Wigan ☎ B Caswell 0942 213402

JJC Amiga correspondence course £50/year. Contact PO Box 19, High Wycombe, Bucks HP11 1UF. ☎ 0494 983347

Kent Youth Computer Group Contact Jim Fanning ☎ 0233 629804 North Youth Centre, Essella Rd, Ashford, Kent. Meetings at the North Youth Centre, Thursdays 7 – 10pm computer fair visits, video and DTP work, monthly newsletter Membership 40p/month

Lothian Amiga Users Group Contact Andrew Mackie ☎ 0506 630509 52 Birniehill Ave, Bathgate, W Lothian EH48 2RR Advice and help in buying hardware, software etc, group buying, dealers' circulars welcome. Membership free

Maritime Amiga Club Maritime computing, interact with seafarers ashore on Amigas. Contact CDR K Osei, GN Ships Refit Office, 51 Rue de la Bretonniere, 50105 Cherbourg, France. ☎ 33 33225447

Marksman (Trojan Phazer user group) Contact David Green, 67 Thicket Drive, Maltby, Rotherham, S Yorkshire S66 7LB Promotes use of the Trojan Phazer, swaps PD and own programs, aims to set up a disk magazine

N Ireland Amiga User Contact Stephen Hamer, 98 Crebilly Rd, Ballymena, Co Antrim BT42 4DS. Disk based mag £2.50/issue. Free PD, SAE for further info

Norwich Masked Heros SAE for info. Free membership. Contact Zorro, 278 Aylsham Rd, Norwich, Norfolk NR32RG ☎ 0603 409899

Pennine Amiga Club 26 Spencer Street, Keighley, West Yorkshire BD21 2BU. Free membership, free advice and a newsletter. Contact Neville Armstrong for more info ☎ 0535 609263

Perth and district amateur computer society Contact Alastair MacPherson 137 Glasgow Rd, Perth. Meetings third Tuesday in every month, 8pm. General advice, talks, Amiga PD. Membership £6 or free for under 16s

Public Domain Exchange Demos, music, utilities, animation. Annual fee £8 Contact D McLeish, 26 Taunton Ave, Leigh, Lancs WN7 5PT

Public Domain User Group Swaps PD, provides advice. SAE to 12 Oxford Rd, Guildford, Surrey

PUG Contact S Jackson ☎ 0446 772331 Whitebeam Cottage, Trerhyngyll, Cowbridge, S Glamorgan Cheap PD library, swap hints, reviews, articles etc. SAE for more details

Redburn Computer User Group Contact Paul Armstrong ☎ 0294 56003, 12 Highfield St, Kilwinning, Ayrshire KA13 7BN. Meetings at the Redburn Community Centre, Dickson Drive, Irvine. Group meets every second Wednesday from 5 Aug 92, 6.45 – 9.30pm. Help, ideas, PD and shareware, graphics and business. Membership 75p per meeting; £7/year

Rye Computer Club Swap/meet at the Rye Community Centre. For info contact Oliver Campion, 71 The Mint, Rye, E Sussex TN31 7DP ☎ 0797 222876

Serious Amiga Users Membership £5, £1 admission. Contact J Kucak for more: ☎ 0706 290387. Fortnightly meetings 7.30-11 at the High Crompton Conservative Club

Shieldsoft PD at Wilmar Lodge, 13 Churton Rd, Rhyl, CLwyd.LL18 3NB. Write for more information. Basic programming help. Advice on the CLI and AMOS. Disks from only 50p to 80p. Membership free ☎ 0745 343044

Sherlock PD Quarterly disk mag, help and advice for beginners. 50p/disk. A Doyle, 44 Milton Street, Warrenpoint, Co Down, N Ireland

Shropshire Amiga Link Advice, monthly disk mag, PD £15/year fee. Contact N Cockayne, 2 Dodmoor Grange, Randlay, Telford, Shropshire TF3 2AW ☎ 0952 591376

Slim Agnus 115 Brocks Drive, North Cheam, Sutton, Surrey SM3 9UW. Group meets the last Thursday of every month. PD library, BBS, advice from Amiga experts. Contact Philip Worrel.

Software Exchange Service 13 Bournville Lane, Stirchley, Birmingham, West Midlands B30 2JY. For more info ☎ Michael Pun 021-459 7576

South 16 Bimonthly mag and disk, also PD library. SAE for more info. £10/year. Contact Bruce, PO Box 16, Southampton SO9 7AU

South Wales Club Newsletter, PD library, free newsletter, programs, help and advice. For more info contact D Allen 53 West Avenue, Trecenydd, Caerphilly, CF8 2SF

Unique Styles Derek at 15 Montgomery Rd, Highbrooms, Tunbridge Wells, Kent on 0892 518319. By post only. For Amiga artists, programmers/musicians. Free membership

Wardray Hern Consortium User group of user groups for Amiga and possibly others. Membership fees to be discussed and incurred. PD library to be set up. Also Hern connection – worldwide contacts wanted. SAE and disk to WardCon info, (AS) Warren Hardy, 21 Stockfield Ave, Fenham, Newcastle upon Tyne NE5 2DX

Warpdrive (friends of Amiga) Amiga help-line, PD library, bi-monthly disk mag, free drinks, competitions and infosheet. £15 a year. Contact B Scales 110 Burton Ave, Balby, Doncaster DN4 8BB ☎ 0302 859715

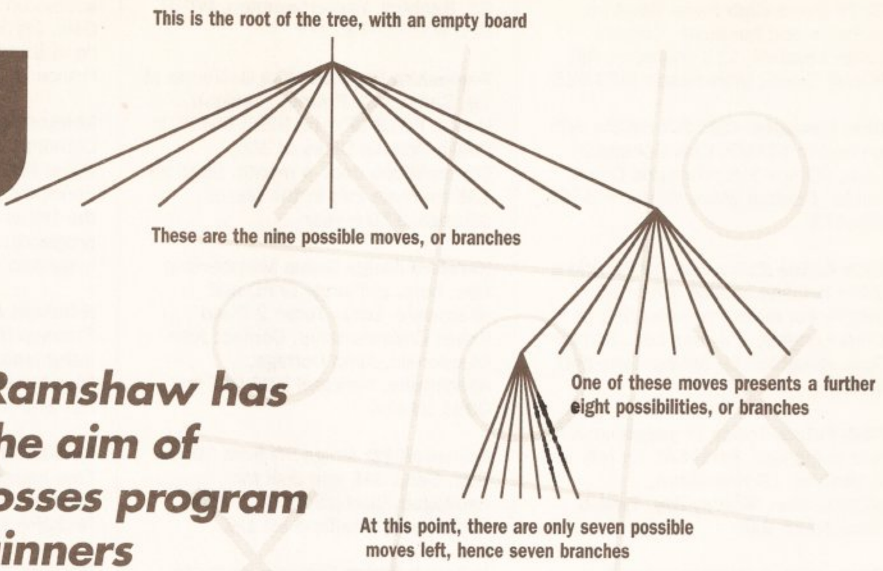
WCSPSA! Help available. PD disk of your choice and newsletter every month. PD at £1. Membership fee £25. For more information contact A Jamieson ☎ 0749 677609

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Hacking away



Garden shears in hand, Cliff Ramshaw has a look at pruning trees with the aim of improving his noughts and crosses program in his ongoing tutorial for beginners

Now that we've looked at all of the important routines which constitute a noughts and crosses program, it's time to put them together to make a working game. The finished version is shown in Listing 1 on the opposite page.

If you type this in and run it, you may well be shocked. It takes the computer in excess of 15 minutes to make its first move. With every new move made, this response time is reduced, until the last couple of moves are made instantaneously. If you have the patience to persevere, you'll find that the computer is an infallible player – it always either wins or forces a draw. Nevertheless speed is certainly a problem with this program. Fortunately there are a couple of steps that can be taken to remedy it.

The first is to create a separate first move generator. At the beginning of the game there are more possible positions for the computer to move into than at any other time, and therefore it takes longer for it to reach a decision. What we need is an entirely separate, and much faster, decision making process for just this one move. The principle is the same as that used in chess programs, which keep a library of possible opening moves and choose one at random.

> *"At each stage, the computer plays every single possible game"*

The difference is that with noughts and crosses there is only one sensible opening move: to take a corner position. OK, that's actually four possible moves, but there is no material difference in choosing one corner over another. In fact, no decision making process is needed at all for the first move: all we have to do is place the computer's nought in the top left hand corner of the board, at co-ordinates (1,1). This can be done by modifying the If clause just after the statement which reads:

```
Input "Would you like to ↲
go first?";
```

to the following:

```
If Upper$(Left$(A$,1))="N" ↲
Then BOARD(1,1)=NOUGHT
DISPLAY
```

and so on as before. The function Upper$ converts any lowercase characters in a string to uppercase. It's used here so that we don't have to check for both an 'n' and an 'N' character. The function Left$ takes a string and returns the left hand part of it, of a length determined by the number following the string's name and a comma. In this case, Left$ yields only the first character from the string A$.

Note that if the player elects to go first, then the computer's responding move is chosen in the normal way, since it is dependent on the player's move.

Of course, this doesn't affect the speed of the rest of the game, which still leaves something to be desired. The solution lies in a technique known as pruning.

PRUNING PRINCIPLES

The term arises because of the search strategy that the program adopts, which is commonly called a search tree. The initial board position is the root of the tree, and each of the possible moves that the computer tries forms a branch of the tree. With each level of recursion, these branches split as each of the possibilities at that level is tried out. When one of these branches has gone as far as it can – in other words, once the game has ended along that branch – the final move is termed a leaf.

Have a look at the diagram directly above for a clearer illustration of the analogy.

A THOROUGH SEARCH

With the program as it stands every branch is looked at, right up to the leaves.

At each stage in the game, the computer plays every single possible game from then onwards to the end of the game, and then chooses the one that it considers best. However, it is possible to realise that searching certain branches are fruitless (sorry!) and that there is no point in exploring them further. These branches are cut off from the search tree, or 'pruned', leaving the computer free to search those branches that are more likely to yield results.

How, you may well ask, is this done? Well, it goes like this...

MODIFYING MIMAX

The procedure MIMAX has to be modified to take two extra parameters, LEAST and CUTOFF. It now looks as follows:

```
Procedure ↲
MIMAX[TURN,LEAST,CUTOFF]
Shared BOARD(),EMPTY
GAMEOVER
If Param=True
STATIC[TURN]
RESULT=Param
Else
LEASTSOFAR=LEAST
For X=1 To 3
For Y=1 To 3
If LEASTSOFAR>CUTOFF
If BOARD(X,Y)=EMPTY
BOARD(X,Y)=TURN
MIMAX[-TURN,-CUTOFF,- ↲
LEASTSOFAR]
BOARD(X,Y)=EMPTY
If Param<LEASTSOFAR
LEASTSOFAR=Param
End If
End If
End If
Next Y
Next X
RESULT=-LEASTSOFAR
End If
End Proc[RESULT]
```

The only other modification to be made is to the BESTMOVE procedure, the only place from which MIMAX is called (aside from within itself). The call has to be modified to take these two new parameters into account. So the line which read:

```
MIMAX[-TURN]
```

should be modified to read:

```
MIMAX[-TURN,255,-255]
```

MIMAX looks at each empty board position in turn, and places a piece in it. Then it calls itself recursively. The result that is returned is the best possible score, the lowest, that could be obtained as a consequence of making this move.

The computer knows that if the move considered gives it the opportunity to win the game, then there is no point in going further and checking the other possible moves from this position. In this case, none of the other moves are checked at this level of the recursion and the routine ends.

VALUABLE MOVES

When MIMAX is initially called from BESTMOVE, the variables LEAST and CUTOFF are given values of 255 and -255 respectively. The variable LEAST is used to initialise the variable LEASTSOFAR, which keeps a track of the best move found so far by MIMAX. The value is initially very large so no matter what the score of

a move is found to be, it will be assigned to LEASTSOFAR in preference to 255. In fact, LEASTSOFAR will quickly diminish to a value of +1 if not lower, the only possible values returned from a call to MIMAX being -1, 0 and +1.

The negative of this value is then passed to the recursive invocation of MIMAX as the CUTOFF parameter. Meanwhile the CUTOFF variable (which has a value of -255 initially) is inverted and passed to the recursive invocation of MIMAX as the LEAST parameter.

After MIMAX has checked one space on the board and then called itself, it will be doing so with a value of 255 for LEAST (as before) and a minimum value of -1 for CUTOFF.

At this secondary level of recursion, the positions on the board will cease to be checked as soon as one is found with a score less than or equal to CUTOFF. Given that CUTOFF has a value of -1, this will occur as soon as a move resulting in a win for the computer has been found. If CUTOFF has a value of 0, it will occur as soon as a move resulting in a win or draw is found. If CUTOFF has a value of +1, then no further moves will be checked at this level.

LESS CHECKS

As you can see, the process of swapping CUTOFF and LEASTSOFAR at each successive level of recursion means that many fewer positions have to be checked before a final result is established. If you modify the program as instructed above, you'll find there's a marked difference in efficiency.

Well that about wraps it up for noughts and crosses. There are of course many other modifications you could make to the program, or even completely different approaches to the problem, but I'll leave these for you to make.

PRACTICE MAKES PERFECT

This series should have taught you enough of the fundamentals of programming to give you the confidence to attempt writing other programs of your own.

We've gone right from the basics of programming to fairly advanced concepts such as procedures, local variables and recursion.

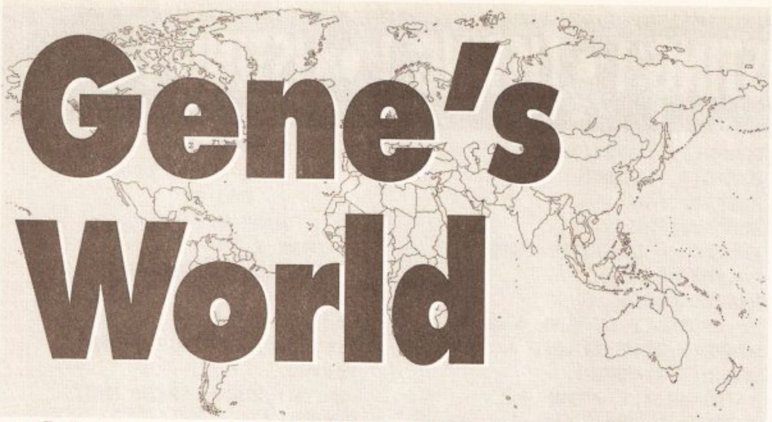
Hopefully, you've managed to keep up, but if not I suggest you have a look back through the articles, pay careful attention to the code examples and, above all, mess around yourself. Improving your programming ability, like that of any activity, is best achieved through practice. So keep experimenting! Think of a program you'd like to have, and start writing it. Good luck. AS

LISTING 1 • LISTING 1 • LISTING 1 • LISTING 1

```
LISTING 1
Dim BOARD(3,3)
EMPTY=0
CROSS=-1
NOUGHT=1
For X=1 To 3
   For Y=1 To 3
      BOARD(X,Y)=EMPTY
   Next Y
Next X
Cls
Input "Would you like to go
first? ";A$
If Upper$(Left$(A$,1))="N"
   BESTMOVE[NOUGHT]
   BOARD(XBEST,YBEST)=NOUGHT
End If
DISPLAY
Repeat
PMOVE
DISPLAY
GAMEOVER
If Param=False
   XBEST=0
   YBEST=0
   BESTMOVE[NOUGHT]
   If XBEST<>0

BOARD(XBEST,YBEST)=NOUGHT
      DISPLAY
   End If
End If
FULL
A=Param
WON[NOUGHT]
B=Param
WON[CROSS]
C=Param
Until(A=True) or(B=True)
or(C=True)
Locate 0,20
If A=True
   Print "It's a draw"
Else
   If B=True
      Print "I won"
   Else
      Print "You won"
   End If
End If
Stop
Procedure HORIZLINE[TURN]
Shared BOARD()
RESULT=False
If((BOARD(1,1)=TURN and
BOARD(2,1)=TURN and
BOARD(3,1)=TURN)
or(BOARD(1,2)=TURN and
BOARD(2,2)=TURN and
BOARD(3,2)=TURN)
or(BOARD(1,3)=TURN and
BOARD(2,3)=TURN and
BOARD(3,3)=TURN)) Then
RESULT=True
End Proc[RESULT]
Procedure VERTLINE[TURN]
Shared BOARD()
RESULT=False
If((BOARD(1,1)=TURN and
BOARD(1,2)=TURN and
BOARD(1,3)=TURN)
or(BOARD(2,1)=TURN and
BOARD(2,2)=TURN and
BOARD(2,3)=TURN)
or(BOARD(3,1)=TURN and
BOARD(3,2)=TURN and
BOARD(3,3)=TURN)) Then
RESULT=True
End Proc[RESULT]
Procedure DIAGLINE[TURN]
Shared BOARD()
RESULT=False
If((BOARD(1,1)=TURN and
BOARD(2,2)=TURN and
BOARD(3,3)=TURN)
or(BOARD(3,1)=TURN and
BOARD(2,2)=TURN and
BOARD(1,3)=TURN)) Then
RESULT=True
End Proc[RESULT]
Procedure WON[TURN]
Shared BOARD()
RESULT=False
HORIZLINE[TURN]
If Param=True Then RESULT=True
VERTLINE[TURN]
If Param=True Then RESULT=True
DIAGLINE[TURN]
If Param=True Then RESULT=True
End Proc[RESULT]
Procedure FULL
Shared BOARD(),EMPTY
RESULT=True
For X=1 To 3
   For Y=1 To 3
      If BOARD(X,Y)=EMPTY Then
RESULT=False
   Next Y
Next X
End Proc[RESULT]
Procedure GAMEOVER
Shared BOARD(),NOUGHT,CROSS
RESULT=False
FULL
If Param=True Then RESULT=True
WON[NOUGHT]
If Param=True Then RESULT=True
WON[CROSS]
If Param=True Then RESULT=True
End Proc[RESULT]
Procedure STATIC[TURN]
Shared BOARD()
WON[TURN]
If Param=True
   RESULT=1
Else
   WON[-TURN]
   If Param=True
      RESULT=-1
   Else
      RESULT=0
   End If
End If
End Proc[RESULT]
Procedure MIMAX[TURN]
Shared BOARD(),EMPTY
GAMEOVER
If Param=True
   STATIC[TURN]
   RESULT=Param
Else
   LEASTSOFAR=255
   For X=1 To 3
      For Y=1 To 3
         If BOARD(X,Y)=EMPTY
            BOARD(X,Y)=TURN
            MIMAX[-TURN]
            BOARD(X,Y)=EMPTY
            If
Param<LEASTSOFAR
LEASTSOFAR=Param
            End If
         End If
      Next Y
   Next X
   RESULT=-LEASTSOFAR
End If
End Proc[RESULT]
Procedure BESTMOVE[TURN]
Shared
BOARD(),XBEST,YBEST,EMPTY
GAMEOVER
If Param=True
   XBEST=0 : YBEST=0
Else
   LEASTSOFAR=255
   For X=1 To 3
      For Y=1 To 3
         If BOARD(X,Y)=EMPTY
            BOARD(X,Y)=TURN
            MIMAX[-TURN]
            BOARD(X,Y)=EMPTY
            If
Param<LEASTSOFAR

LEASTSOFAR=Param
               XBEST=X
               YBEST=Y
            End If
         End If
      Next Y
   Next X
End If
End Proc
Procedure PMOVE
Shared
BOARD(),CROSS,NOUGHT,EMPTY
GOOD=0
Repeat
Locate 30,16
Print "         "
Locate 0,16
Input "Enter your move
(across, down)";X,Y
If(X>=1) and(X<=3) and(Y>=1)
and(Y<=3) Then If
BOARD(X,Y)=EMPTY Then GOOD=1
Until GOOD=1
BOARD(X,Y)=CROSS
End Proc
Procedure DISPLAY
Shared
BOARD(),CROSS,NOUGHT,EMPTY
Cls
Print "  1 2 3"
Print
Print "1"
Print
Print "2"
Print
Print "3"
Draw 28,0 To 28,59
Draw 44,0 To 44,59
Draw 0,28 To 59,28
Draw 0,44 To 59,44
For X=1 To 3
   For Y=1 To 3
      Locate X*2,Y*2
      If BOARD(X,Y)=CROSS Then
Print "X"
      If BOARD(X,Y)=NOUGHT
Then Print "O"
   Next Y
Next X
End Proc
```



Gene's World

This month Philip Gladwin shows how virtual creatures learn the ropes of life with a little help from genetic algorithms

If you were listening last month you'll remember that the point of this series is to show how the principles of natural selection can help us write code that evolves into a superfit state. The problem we're going to look at is that faced by every small, hungry, virtual creature wandering around in a virtual wood. When we first meet this creature it will be roaming around, getting nowhere, banging its head on trees and missing the food that's under its nose because it's simply too stupid to find it. We're going to bring it to a state where we can watch it run straight for the food and miss the trees.

One way of helping such a creature would be to spoonfeed it with expert system type rules about what to do depending on where it finds itself in the wood. Then whichever situation it encountered it would recognise it and know what action would bring it most benefit.

Of course there are people who would say that in order to be truly charitable you have to give hungry people tools rather than food. So let's be truly humane and give this creature the tools for its own salvation; principles by which its knowledge about the wood can evolve until it becomes useful.

Thus, instead of our creature being dependent on us for everything, it will learn – completely un-assisted – rules to show that banging its head on trees is pointless and that eating food is the best way of stopping that gnawing pain in its stomach. Then it can stand up on its own six feet and be proud of what it has done instead of being forever in our debt. (The other thing it could do is come after us and murder us for not giving it food when it was hungry, but that's another story).

GENE LIVES!

So how do we simulate this creature? (Let's, out of a kind of weak humour, call it Gene). There are four principles that are worth thinking about before we do any coding:

- When any creature is born it lives in a continual torrent of sensory signals. This must be so for Gene, and he must learn to distinguish which signals are important, and which are irrelevant.

- Gene must be capable of taking actions which will change the sensory signals he is perceiving.

- He must learn pretty quickly that some signals have a special importance for him – such as those that occur when he eats some food.

- He must want to make those special signals happen as often as he can. This is a priority that ought to be reflected in his actions.

Gene's environment, the wood where he first sees the light of day, is full of obstacles; trees and rocks, and food; apples. We can represent a wood like this on the computer by creating a grid, with squares that are empty, or that hold trees, or that

CORRECTION CORNER

The astute among you will have noticed that a slight error crept into last month's diagram illustrating the three rule classifier system. The top row should have had a '1' under the 'feed it' column. Apologies for any confusion which this may have caused.

GENETIC ALGORITHM PROGRAM
PART ONE

```
Dim WOOD$(16),RULE$ ↵
(40,2),STRENGTH#(40),M(40) ↵
,A(40),OLD_A(40),PERCENT(110)
Dim AV(50),SPLICE(40)
Global WOOD$(),RULE$(), ↵
XLOC,YLOC, ↵
REWARD_FLAG,GENE_VISION$, ↵
STRENGTH#()
Global ↵
M(),A(),OLD_A(),WALKED, ↵
CYCLE_COUNTER,FIRST_TIME
INIT
Repeat
CYCLE
Inc COUNT
Until COUNT=550
Procedure BUILD_WOODS
WOOD$(1)="................"
WOOD$(2)="................"
WOOD$(3)="..T..T..T..T...."
WOOD$(4)="..F..F..F..F...."
WOOD$(5)="................"
WOOD$(6)="................"
WOOD$(7)="...T..T..T..T..."
WOOD$(8)="...F..F..F..F..."
WOOD$(9)="................"
WOOD$(10)="................"
WOOD$(11)="..T..T..T..T...."
WOOD$(12)="..F..F..F..F...."
WOOD$(13)="................"
WOOD$(14)="................"
WOOD$(15)="................"
WOOD$(16)="................"
End Proc
Procedure CYCLE
PROBLEM
If Rnd(3)=0 Then GENETIC
Inc CYCLE_COUNTER
If CYCLE_COUNTER=51 Then ↵
CYCLE_COUNTER=1
GRAPH_RESULT
End Proc
Procedure DRW_WOOD
Paper 0 : Locate 50,0
Print WOOD$(1)
For I=2 To 16
Locate 50,I-1
Print WOOD$(I)
Next I
Locate XLOC+49,YLOC-1 : ↵
Pen 5 : Print "*" : Pen 2
End Proc
Procedure FIND_CONTENTS[I]
' used by refresh_vector to ↵
look around GENE
If I=0
Y=YLOC-1
If Y=0
Y=1
End If
LEVEL$=WOOD$(Y)
CONTENT$=Mid$(LEVEL$,XLOC,1)
Goto LEAVEPROC
End If
If I=1
Y=YLOC-1 : X=XLOC+1
If Y=0
Y=1
End If
If X=17
X=16
End If
LEVEL$=WOOD$(Y)
CONTENT$=Mid$(LEVEL$,X,1)
Goto LEAVEPROC
End If
If I=2
X=XLOC+1
If X=17
X=16
End If
LEVEL$=WOOD$(YLOC)
CONTENT$=Mid$(LEVEL$,X,1)
Goto LEAVEPROC
End If
If I=3
Y=YLOC+1 : X=XLOC+1
If X=17
X=16
End If
If Y=17
Y=16
End If
LEVEL$=WOOD$(Y)
CONTENT$=Mid$(LEVEL$,X,1)
Goto LEAVEPROC
End If
If I=4
Y=YLOC+1
If Y=17
Y=16
End If
LEVEL$=WOOD$(Y)
CONTENT$=Mid$(LEVEL$,XLOC,1)
Goto LEAVEPROC
End If
If I=5
Y=YLOC+1 : X=XLOC-1
If Y=17
Y=16
End If
If X=0
X=1
End If
LEVEL$=WOOD$(Y)
CONTENT$=Mid$(LEVEL$,X,1)
Goto LEAVEPROC
End If
If I=6
X=XLOC-1
If X=0
X=0
End If
LEVEL$=WOOD$(YLOC)
CONTENT$=Mid$(LEVEL$,X,1)
Goto LEAVEPROC
End If
If I=7
Y=YLOC-1 : X=XLOC-1
If Y=0
Y=1
End If
If X=0
X=1
End If
LEVEL$=WOOD$(Y)
```

```
CONTENT$=Mid$(LEVEL$,X,1)
Goto LEAVEPROC
End If
LEAVEPROC:
End Proc[CONTENT$]
Procedure INIT
' Opens the screen, ↵
draws the wood,
' draws the graph to check ↵
learning progress
   Randomize Timer
   Screen Open
1,620,240,16,Hires
   Curs Off : Flash Off : ↵
Cls 0 : Ink 2
   Polyline 19,10 To 19,210 ↵
To 600,210
   Draw 20,10 To 20,210
   Draw 14,10 To 19,10
   Draw 20,10 To 20,90
   Draw 14,50 To 20,50
   Draw 14,90 To 20,90
   Draw 14,130 To 20,130
   Draw 14,170 To 20,170
   Draw 70,210 To 70,215
   Draw 120,210 To 120,215
   Draw 170,210 To 170,215
   Draw 220,210 To 220,215
   Draw 270,210 To 270,215
   Draw 320,210 To 320,215
   Draw 370,210 To 370,215
   Draw 420,210 To 420,215
   Draw 470,210 To 470,215
   Draw 520,210 To 520,215
   Draw 570,210 To 570,215
   Draw 620,210 To 620,215
   Ink 1
   Draw 21,50 To 600,50
   Draw 21,90 To 600,90
   Draw 21,130 To 600,130
   Draw 21,170 To 600,170
   Gr Locate 19,10
   Pen 2 : Paper 0
   Locate 0,0 : Print 50
   Locate 13,27 : Print 100
   Locate 25,27 : Print 200
   Locate 38,27 : Print 300
   Locate 50,27 : Print 400
   Locate 63,27 : Print 500
   BUILD_WOODS
   INIT_RULE_SET
End Proc
'
Procedure INIT_RULE_SET
 '______________________________
 ' Build Classifiers + ↵
Actions randomly, assign each
 ' classifier a starting ↵
strength of 100
 '______________________________
For I=1 To 40
CLASSIFIER$=""
For J=1 To 16
POI=Rnd(2)
If POI=0 Then BIT$="0"
If POI=1 Then BIT$="1"
If POI=2 Then BIT$="?"
CLASSIFIER$=CLASSIFIER$+BIT$
Next J
RULE$(I,1)=CLASSIFIER$
RULE$(I,2)=Str$(Rnd(7))-" "
STRENGTH#(I)=100.0
Next I
End Proc
```

hold food. As we're using Basic a handy way of doing this is to create this grid from an array of strings. Look at the procedure ***BUILD_WOOD*** in the source code opposite. It establishes 16 strings, of 16 characters each, to create a grid 16 rows deep and 16 columns wide. Each character represents the contents of that square in the grid. The dots **.** indicate that there is a space in the wood at that point; the capital ***T***s mean that there is a tree filling that square; and the ***F*** shows there is food in that square.

Although the grid created by the code in ***BUILD_WOOD*** is quite small, Gene won't see it like that. Gene has the power to ignore the edges and travel immediately from, say, the extreme right to the extreme left in one leap. To all intents and purposes therefore, Gene is cast adrift in an unbounded wood.

The raw materials for Gene are a set of rules and actions, holding information about the stimuli and responses available to him. Although Gene may be a perfectly fascinating character in his own right who we would dearly love to get to know, there are only a couple of things that we actually need to know about him: where he is in the grid, and the current state of what he thinks about the world.

The first is easy – define two global variables called XPOS and YPOS and update them every time he actually moves (as opposed to when he decides to move and runs smack into a tree.)

> ***"The raw materials are a set of rules and actions, holding information about the stimuli and responses available..."***

The second is more complicated. Assume that Gene has two sense receptors, one firing when it detects something opaque in front of it, and one doing the same for things that smell. This isn't a whole lot of detectors, but it's enough to deal with the three types of thing in Gene's world: space, trees, and food. Space is perceived by Gene as an absence of signal at both of his detectors. A tree causes his opacity detector to switch on, but produces no response from his smell detector; and food causes a positive response from both. We can say therefore that space in any particular location is represented by the digits ***00***, a tree by ***01***, and food by ***11***. As Gene can see the contents of all his neighbour squares, at any one time his knowledge can be described by a 16 bit vector, with two bits for each of the eight possible directions. (See the diagram below for an illustration of this). In the program this vector – the sum of what Gene can currently see – is stored in the string ***GENE_VISION$***

see if he recognises the situation. If he can find a classifier that matches ***GENE_VISION$***, with the ***?***s in the classifier acting as wild cards and matching both ***1*** and ***0***, then he is in luck – he knows what to do.

The knowledge about the action Gene will take in that situation is held in the second column of ***RULES()***, which contains strings like "2", or "7". These correspond directly to directions numbered 0-7, starting at 12 o'clock and proceeding clockwise (therefore a direction of 3 is SE, and a direction of 0 is due North.)

Diagram 1

```
  . . . . . .          * = Gene
. . . . . . .          Raw Sense data vector: . T F . . . . .
. T . . T . .
. F . * F . .          Processed Sense data vector
. . . . . . .          (Gene_Vision$): 00 01 11 00 00 00 00 00
  . . . . . .          (00 = space, 01 = a tree, and 11 = some
                       food)
```

Top down view of Gene's world: he can see a space directly ahead of him, a tree to his north east, and some food directly to his east. Apart from that all around him is empty

THE STUFF OF MEMORIES

So Gene can see. He can also move. We assume that when he actually trips over food he eats it, and that he can't move through solid objects. Therefore in any situation Gene has the possibility of taking one of up to eight actions. But if he's ever going to move at all sensibly he needs a memory. This memory should hold many of the situations he has encountered before, as well as the actions he took at that time.

The array ***RULE$(40,2)*** is such a memory – it has room for 40 different situations, along with their associated movements. The first column of ***RULE$()*** is filled with strings 16 characters long, such as "0001100110100111" or "00001101010??0?1". These are classifier rules (remember them from last month? These are slightly different, being twice as long, and each rule coming complete with an associated strength carried in the array ***s#(40)***). Every time Gene moves to a new position within the wood he takes a look around him and then has a look in his memory to

Now, it would be easy to cheat and, after looking at the wood described in ***Procedure BUILD_WOOD***, to fill Gene's memory with rules that matched particular situations and had the correct action to take already supplied. (Like for example in the situation where Gene has a tree to his NW and food to his W. ***GENE_VISION$*** would be 0000000000001101, and a good classifier/action pair to hard code in would be something like 000000000000???1/6, making Gene move west to take the food directly.) But that's not the point. We want Gene to come to this knowledge himself, and so, courtesy of ***Procedure INIT_RULE_SET***, Gene's memory starts off with junk – utterly random information. (Sound familiar? Hmm, yes, I thought so). Each rule is filled with random 0s, 1s and ?s, and given the same starting strength of 100. This ensures that when Gene starts off wandering around in the wood he does so completely at random. AS

COMING NEXT MONTH: GENE WALKS, TALKS, AND TAPDANCES

As you can see, most of the code I've given you this week has been to do with initialisation. I've explained the problem, and the basics of the setup we're going to use to solve it. Procedures like MOVE and FILL_VECTOR are fairly straightforward mechanical stuff, and shouldn't cause you too much trouble. Next month I'll be getting onto the harder stuff – exactly how this random mass of classifiers is prodded along the path of evolution.

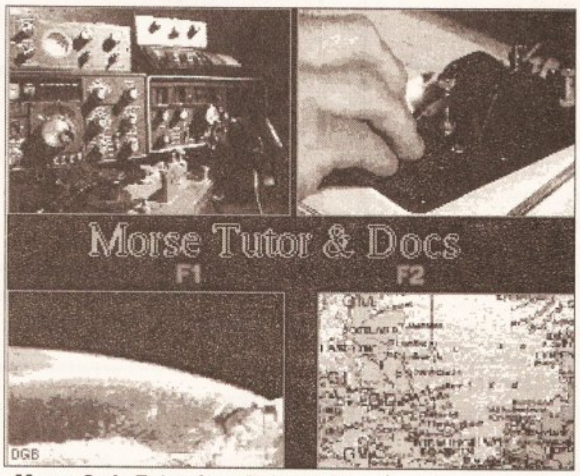
Software for free

Ian Wrigley checks out the best in Amiga PD and disk mags. This month there's a special investigation into some of the more eccentric offerings available

After the whinges of the last couple of months, the software seems to have started flowing once more. My thanks to the PD libraries and the individual authors who have been sending in software for review. Remember, if you've written a PD or shareware program that you want me to take a look at, send it in c/o *Amiga Shopper* at the usual address.

This month I'm looking at some licenseware from Deja Vu and Amiganuts, a couple of new disk magazines and the usual round-up of what's best in the freely distributable software market-place.

If there are any specific subject areas that you'd like to see me cover in the future, be sure to write in and let me know.



***Morse Code Tutor*, from Deja Vu, is a powerful and easy to use tutor for radio hams – and the loading screen looks good too!**

MORSE CODE TUTOR

Deja Vu disk L/101

This program, by Paul Higginson (G7EZH) and Jason Dudgeon, is, as the name suggests, a Morse code tutorial program primarily intended for radio amateurs. However, it does a little more than many other tutors. While there are some areas that could, I feel, use some improvement, overall this really is a powerful tutorial program – I might even get around to finally learning Morse myself!

The program, which is written in AMOS, is supplied on a self-booting disk that contains, as its first loading screen, the usual Deja Vu copyright information. Clicking the mouse button takes you on to an attractive, digitised image of a typical Ham shack, and then to the main selection screen, where you choose F1 for the program or F2 for the documentation – which is well written and concise.

Entering the program proper, you decide on the program's action in the standard way – by selecting choices from the menu bar. There are options to change the pitch, speed and volume of the Morse code to be sent, although there are no examples of what result any of this will have. For instance, the 'change pitch' command displays a neat little sliding bar from which you select the pitch at which the Morse will be sent. But although the actual pitch is displayed as a value in Hertz, there's no audible example of what this will sound like – just a perky little 'ping' which has no relation to the tone that you've set.

Where the program stands out from the competition is that it not only sends Morse, but receives it too – something very few other programs do. You can either use the mouse (left button is a dot, right button a dash), or the fire button of a joystick. And, as the authors point out, it's easy to connect a real Morse key by wiring it into an old joystick connector. The program seems to receive Morse fairly well, although – as with all computer receivers – your keying has to be pretty accurate in terms of the relative lengths of dots and dashes. Still, this is no bad thing – the more accurate your keying is, the better.

The program can limit the range of characters sent to sections of the alphabet, the whole alphabet or full alphanumeric and special characters. There are send and receive practice modes and quizzes (although the method that the program uses to work out your accuracy is a little suspect), and the machine can be hooked up to your Morse key when you're actually sending on air, so that you have a text record of what you've sent.

While other programs only teach you to receive Morse – leaving you to develop dreadful keying habits with no correction – this one teaches you how to send too. If you're thinking of learning Morse code – either for your

continued on page 158

RATING THE PROGRAMS

Just to be awkward, I rate the software that I review in two different ways, depending on what it is. Disk magazines, collections of clip art and the like are given a 'value for money' rating, since you're paying for one thing on the entire disk. Single programs which appear in a collection of others, or programs which I've downloaded from bulletin boards, are given a 'program rating', which reflects how good I think they are, taking into account usability, bug-proofness and so on. Both ratings are out of a maximum possible 10.

BEGINNERS START HERE

What is PD?

PD is a general term which many people incorrectly use to refer to all freely-distributable software. In fact, PD (which stands for Public Domain) software is only one branch of this area; the other main one is shareware.

Essentially, PD software may be copied and used by anyone, although some authors place restrictions such as not allowing a PD library to charge more than a certain amount for the disk.

Shareware, on the other hand, should be treated more like commercial software.

Although you are allowed to copy and pass around shareware programs, if you like one then you should pay the requested fee to the author – it's normally only £15 or less, and often entitles you to an upgraded version or a printed manual.

Paying your shareware fees encourages software authors to write more programs – and if they don't, the Amiga scene will be a poorer place.

Can I pass other people copies of PD?

Yes – that's the way that it gets to a wide audience. Just make sure that you have followed the author's requirements for distribution – normally that you don't charge more than a certain amount for the disk, and that you make sure that all the documentation is included on the disk.

You can also pass on shareware – but not any registered copies of programs. If, when you pay your shareware fee, the author sends you an improved version of the program, then be careful not to give that out. You should only pass on unregistered shareware.

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U063 ....House Samples 3....Even more acidic sounds
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+U089 ....Journal....Very good account-handler
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+U098 ....Database Master....Comprehensive AMOS database
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U129 ....Super Killers....Kills 120 Virus's
+U130 ....Label designer....Various label printers
+U134 ....Ami Cash....Best accounts package around
+U140 ....Amibase Prof....Excellent database
+U142 ....Super Fonts....More fonts for printing
+U144 ....Sound Tracker Samples (4 disks)....Excellent sounds, particularly drumbeats
+U146 ....Edword....Excellent text editor
+U149 ....The Main Event....File event editor
U150 ....Languages....Spanish, German, Italian + French dictionary
+U151 ....Imploder v4.0....File compresser
+U152 ....PC Task....Emulates IBM + PC programs
+U153 ....File-a-fax....As it sounds
+U154 ....QED....Beginners word processor

DEMOS

+D015 ....Agatron Star Wars (1 meg/2 disks)....Captivating graphics
+D016 ....Acid Music....Some wicked museec & grapheecs!
+D021 ....Budbrain 2....The equally brilliant sequel
D023 ....Bass Megademo....Electrifying graphics & pulsating beat. Get it!
D036 ....Coma/Cebit/Victory (1 meg)....Classic Acid-type demos
+D058 ....Enterprise Leaving Dock....Famous animation
D060 ....Elvira....The sexy lady endows herself!
D061 ....Elvira Activities....Now move her body!
D062 ....5 Ways to Kill a Mole....Funny. Not for animal lovers!
D063 ....Fillet the fish....The possible sequel to Puggs. A must
+D075 ....Girls of Sport....Pretty shots of talented girls
D092 ....Iraq demo (1 meg)....Topical cartoon. Bush meets Saddam! Bang!
+D099 ....Jesus loves Aciid....Mindblowing music and graphics
+D114 ....Mike Tyson anim....Well compiled
D146 ....Red Sector megademo (2 disks)....RSI's classic
+D148 ....The Run (1 meg)....T. Richter's car-chase animation. Good
+D162 ....Stealthy Manoeuvres (1 meg)....Excellent demo
+D166 ....Star Trek Animations....Anims. of USS Enterprise
+D177 ....Star Trek Animations..Agatron no. 17. More like above. Good
D215 ....Another 5 ways to Kill a Mole....It gets sadder!
+D225 ....Reincarnation of Sgt. Pepper (2 disks, 1 meg).Beatles classic
D226 ....Virtual World....Best demo of year?!
+D248 ....Pulling the Trigger....Good demo compilation
D250 ....Jimmy Hendrix....Slides and music
+D251 ....Debbie Harry (2 disks)....Sideshow Blondie
+D253 ....WWF Wrestlers....Hogan & more
D254 ....Ray of Hope....Acidic Demo

MUSIC

+M006 ....Batdance remix....Really good disk. Catchy stuff
+M016 ....Depeche Mode....8 tracks of reasonable quality
+M032 ....Godbrain loves the world....Great acid-house musak
M038 ....Hugo's Excentria...This has to be one of the best house disks
M039 ....I Love Technology Recent production from Beatmaster. Good
+M057 ....Powerpack 3 (1 meg)....Includes Vanilla Ice track
+M059 ....Powerpack 5 (1meg)....4 classy house tracks
+M062 ....Random Access ....Art of Noise and more. Startling acid track
M063 ....Special Brothers....The Last Intention
+M080 ....Pet Shop Boys....Manic mix
+M081 ....Miami Vice....Theme music remix
M084 ....The Wall....Pink Floyd classic
M085 ....James Bond Remix....Catchy Stuff
M086 ....Great Balls of Fire....Goodness gracious
M087 ....Iron Maiden....The Ides of March
M088 ....500 things come back demo....4 relaxing tunes
+M090 ....Led Zeppelin....Stairway to Heaven etc.

GAMES

+G001 ....Autobahn 3000....Control ball through tunnel. Hard
+G003 ....Antep (1 meg)....Adventure, also stot cars
G004 ....Airwar....Fighter simulation. Good shareware game.
+G005 ....All New Star Trek (2 disks)..USS Enterprise classic. Best one
+G010 ....Breakout....Classic bat & ball game
+G011 ....Blizzard....Horizontal shoot-'em up. High quality
G013 ....Bullrun....War-game, based on US Civil War. Control Army
+G014 Adventure Solutions (2 disks) ....Loads of hints of commercial games. Good
+G015 ....Crossfire (1 meg)....Excellent game written in AMOS
+G019 ....Dungeon Delver (2 disks)....Difficult adventure quest
+G021 ....Demolition Mission (1 meg) ....Similar to Balloonacy, good fun
+G023 ....Electronic Train Set (1 meg)....Construct own train set
G029 ....Flaschbier....Old favourite. Get to alarm clock
+G031 ....Gravattack....Control spaceship,. picking up keys
+G043 ....Learn and Play 1 ....Good for the kids. Blackboard maths, etc.
+G044 ....Learn and Play 2....More fun for the kids
+G049 ....Megaball (1 meg)....Excellent game. Improved version of Breakout
G050 ....Master of the Town....Use mouse to smash windows. Very addictive
+G053 ....Mayhem....Brilliant shoot-'em-up
G055 ....Mechforce....Strategy game
G056 ....Monopoly....Board game on disk
+G059 ....Nethack (Fish 460)Good adventure game, recently appraised
G060 ....Pipeline....Build an oil pipeline
+G061 ....Pick up a puzzle (1 meg/2 disks)....Fit the pieces. Good for the kids
G062 ....3D Pool....Control cue with mouse, and it's all pot luck!
G063 ....Pacman....The classic game still here
+G065 ....Pixie Kingdom (2 disks)....Tricky adventure game. Good
+G071 ....Return to Earth (1 meg)....Space adventure
+G072 ....Star Trek: Next generation....Not as good as G005
+G076 ....Star Fleet....Addictive shoot 'em up
G077 ....Seven Tiles....Excellent speedball game from Alpha.
+G081 ....Trek Trivia....Test your Star Trek knowledge
+G083 ....Wooden Ball (1 meg)....Score three goals to win
+G084 ....Wet Beaver Tennis....Simple, but good fun bat & ball game
+G086 ....Wraithed One....Good general knowledge quiz
G098 ....Battleforce....Control battle of robots
G099 ....Cabaret Asteroids....Best version yet. Recommended
G101 ....Trucking On (2 disks, 2 drives) .Role-playing, attack company
+G102 ....Simulation1 (1 meg)Recommended. 5 games including Metro
+G103 ....Mental Image One....Gridrunner, Rebound, Rollerpede
G108 ....Llamatron....Geoff Minters shoot-'em-up
+G109 ....Wheel of Fortune....TV Quiz, computerized
G110 ....Lady Bug....Similar to Pacman. Good stuff
G115 ....Survivor....Role-play an alien! Excellent
G117 ....Midnight Thief....Addictive text adventure
+G124 ....Napoleonic Warfare....High-quality simulation
G125 ....Attic Attac....Kill ghosts in house
G126 ....Pom Pom....Defind Pearl Harbour
G129 ....Stock Market....Speculate at no risk!
G130 ....Battle Pong....Table tennis game-good
G135 ....No Mans Land (1 meg)....2 player shoot-'em-up
+G137 ....Skate Tribe....Skateboarding game
+G143 ....Card Shop....Well presented card games
+G148 ....Galactic Food Fight....Blow up those burgers
+G149 ....Raphaels Revenge....Difficult platform adventure
+G151 ....Hmmmm That's not on the Syllabus....AMOS adventure
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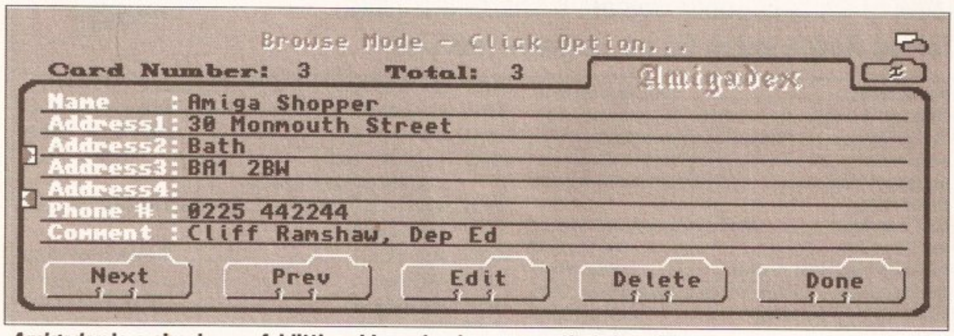
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novice or Class A amateur radio license or just for fun – you should seriously consider getting hold of this program. A couple of tweaks to the user interface would be nice, but all in all *Morse Code Tutor* can be thoroughly recommended.

Value for money 9/10



***Amigadex* is a simple, useful little address book program that does just what it is designed for and no more – which makes a nice change in these days of overblown, over-featured mega-programs**

ACCOUNT MASTER 1.02

Various PD libraries

Account Master is yet another home accounts program. This one, about the seven thousandth to pass across my desk since I started using the Amiga, is written by Martin Platt in AMOS – as, indeed, are many.

Martin's effort is not the easiest to use that I've ever come across, although it does have some neat little touches that other programmers could do worse than copy. For instance, whenever a choice is selected which requires you to hit a button – for instance, when you select an entry you can hit Edit,

> ***"Those of us who just spend until the cashpoint stops working won't have any need for this program..."***

Delete or Cancel – small white bars appear above each of the active buttons.

When you're first using a program, this can save loads of random clicking as you try to work out how to cancel the option that you've just inadvertently selected. And you may well find that you spend quite a lot of time doing just that; the program's interface can be a trifle tricky until you get the hang of it, although when you do it turns out to be quite powerful.

All the usual features are present, including debits, credits, codes to classify each transaction and a range of printing options. There is also the ability to enter direct debits – amount, start date and frequency – which are then automatically entered at the correct times.

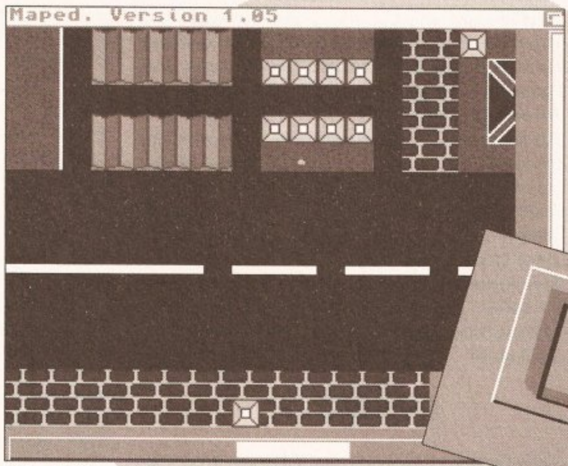
For what seems like the eighth or ninth time since I started this column I'll say it: if you really want to do your home accounts on your Amiga, then this isn't a bad program to use. It seems to be perfectly capable of satisfying those out there who really find it necessary to track every penny in their bank accounts. Those of us who just spend until the cashpoint stops working won't, of course, have any need for the program.

Martin tells me that he's sent the program to a number of PD houses, including PD Soft and UPD Distributors, so you shouldn't have any trouble getting hold of it.

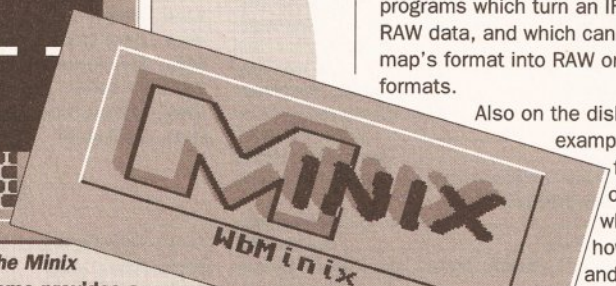
Oh, there are no screengrabs because it's written in AMOS and, as is often the case, it wouldn't co-operate with either of my screengrabbing utilities.

Assuming that home accounts programs are the sort of thing that get you excited, I'd say that a fair rating for this one would be...

Program rating......................7/10



***Map Editor 1.05* saves programmers time and trouble by allowing maps, which can be used as scrolling backgrounds, to be easily created**



***The Minix* demo provides a taster of the Minix operating system, in many ways similar to Unix**

AMIGADEX

PD Soft disk V757

Ray Lambert's *Amigadex* is a $20 shareware program which, as you may have guessed, is an address book application. When launched, it appears as a window the same shape as a file index card, with buttons along the bottom for various options such as adding cards, browsing through data, printing and so on. There are seven data fields which can be used, labelled Name, Address1 through Address4, Phone and Comment. Each field displays 48 characters (although they do horizontally scroll if you enter more than that), so it's clear that the program really is only intended as an address book, and not as a full flat-form database.

The program allows you to import data from a text file, and will let you search for a specific card either by number or by specifying text to search for. When printing, you can specify which fields should be output – although the little 3D checkboxes are a pain, especially since the cursor that the program uses doesn't have any easily identifiable 'hot spot', which means that clicking on a check box is a somewhat trial-and-error affair.

The beauty of *Amigadex* is that a click on a button on the right-hand side of the card iconifies it, and places its icon under your disk icons. So you can start the program via your startup-sequence, and have it available at all times. Double-clicking on the icon expands it to the full card size.

The program can be set to open a specific card database when it's launched – this is done by editing its tool type, and is clearly described in the manual – or, if this isn't the case, you will be asked to find a cardfile via a standard requester.

If you find yourself wanting a simple computer-based address book, but find that many of the currently available programs are too complex and involved, *Amigadex* could be the answer to your prayers. It's certainly worth checking out as an example of a small, elegant program designed for one job, which it does well.

Program rating......................9/10

MAP EDITOR 1.05

Amiganuts

Map Editor, or *MapEd*, is a licenseware program by D Cherry, A Cserbakoi and R Burt-Frost. It is a map editor which allows you to create large images, or 'maps', from 'tiles' – smaller, square pictures. Maps are useful in a variety of situations, primarily games, where a scrolling background often has many repeating features. In cases like these, using maps rather than attempting to create huge IFF files makes a great deal of sense – the amount of memory and disk space saved can be considerable.

The instructions supplied with the program are comprehensive, and shouldn't cause any problems. There are full details on how to install the program on a hard disk or to run it from a floppy, and conversion programs which turn an IFF file into RAW data, and which can change a map's format into RAW or AMOS formats.

Also on the disk are example fragments of C code which show how to load and manipulate a map in your own programs.

And this, really, explains just what the program is for – it enables programmers to concentrate on the programming task itself, not re-inventing the wheel and having to spend weeks working out their own scrolling background routines.

The Map Editor itself is easy to use. A couple of example maps – one a typical runway-style background and one a screenful of text – are included for you to play with, and it doesn't take long before you're relatively expert at manipulating tiles to create your own masterpieces.

Map Editor is a neat, useful

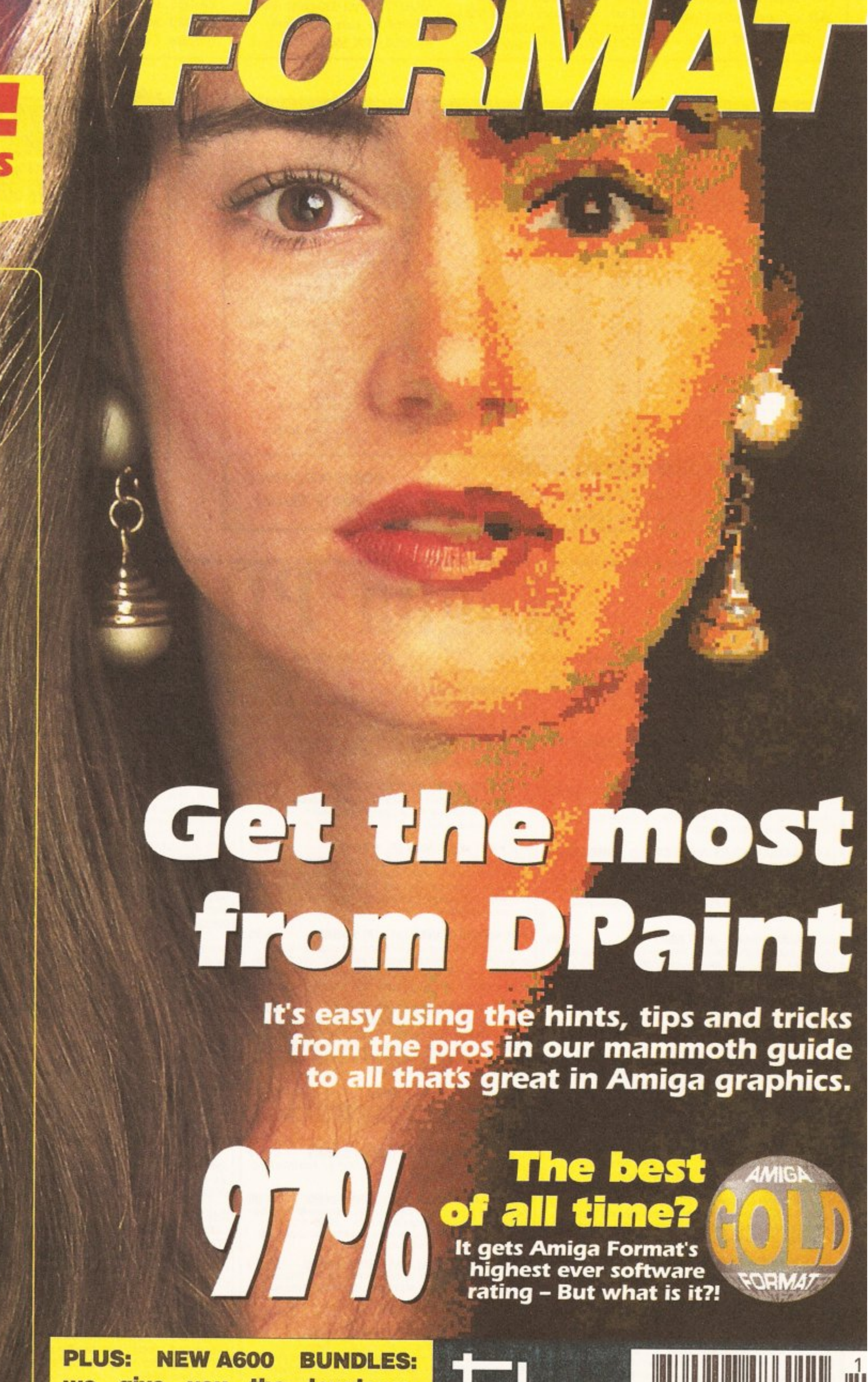
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program and should find a place on any games or demo programmer's hard disk.

Program rating....................8/10

MINIX DEMO

PD Soft disk V711

This disk is a demonstration version of the *Minix* operating system, which works in a similar way to Unix. *Minix* is available on the PC, ST, Amiga and Macintosh, and this demo version contains a subset of the commands, features and so on of the full version – which is sold by Prentice-Hall, and costs $169.

The first problem that you're likely to encounter when trying to launch this program – which is on a self-booting disk – is that you will need to rename the disk to 'boot'. As supplied, the disk was called 'Minix' – which results in a requester asking you to insert 'boot' before you can go any further. I was surprised at this – PD Soft is usually quite good about making sure that things like

> **"The Minix demo... will give you some idea of what commercial programmers have to struggle with."**

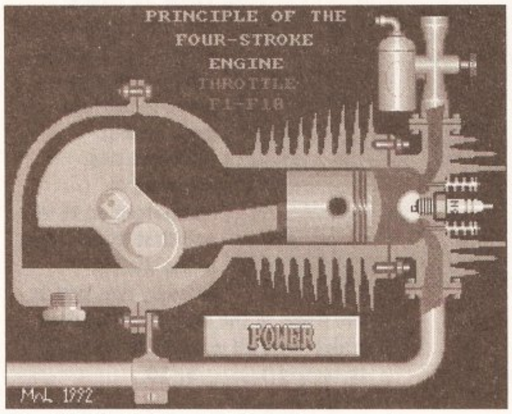
disk names are correct, but this one clearly slipped through the net.

Once the change was made, booting up produced a white-on-blue screen with the 'login:' prompt familiar to anyone who has used any sort of Unix in the past. Type 'root' (the name of the system superuser) and you're in.

Ah! The joys of Unix. Editing password files using dreadful text editors. Typing commands like 'ls -als' to get a directory listing. These are the things that made a generation of programmers into uncommunicative, sad individuals – and now you can experience their frustration too. If you thought that the Shell was difficult to master, just try to get your mind around *Minix*!

To be fair, if you're using any flavour of Unix at the moment you won't find *Minix* too different. The full version is supplied with almost 200 utility programs (the demo has around 25), including a vi clone and four other text editors, along with much of the source code for the system itself. This is because it doesn't contain any AT&T source code – it was written totally from scratch. The full system has a C compiler and supports comms software with the Kermit and ZModem protocols included.

The manual provided, although necessarily a cut-down version of the real thing, isn't bad; you may



***Four Stroke Engine*, by Michael Warren-Leighton, is an animation of an engine – dead useful when you're trying to explain how it works to 30 screaming kids**

struggle if you've never used this type of operating system before, but anyone with a basic familiarity with Unix will soon feel very much at home.

The demo disk, despite being very limited in some respects (no C compiler means that you will be able to do very little, since almost all Minix PD utilities are provided in the form of source code), should at least give you a flavour of the full system. If you're doing a college course in Unix, you may find that *Minix* is close enough for you to use – and $169 is certainly cheaper than buying a Unix workstation to do your homework on!

But even if you are just interested for interest's sake, the Minix demo disk is worth getting hold of – it will give you some idea of what commercial programmers have to struggle with!

Value for money 9/10

ODDITIES

It's been mentioned that I sometimes skip disks with smaller utilities on them, in favour of the more 'major' software offerings that I've been sent. For that reason, in the Oddities section I'll be looking at disks which, because they contain things like animations, text files or tiny utilities, I wouldn't normally write about.

FOUR STROKE ENGINE

PD Soft disk V738

This disk goes to show that something useful, or educational, doesn't need to be a massive and complex application. *Four Stroke Engine* simply displays an animation of such an engine, with a user-selectable engine speed (determined by hitting function keys F1 through F10).

This is just one of a series of animations, called 'inside Info', which have been created by Michael Warren-Leighton, of Kent. As he says in his 'about' screen, "Whilst for the sake of clarity it is not possible to show the intricate workings of complex machines, [these animations] should serve to illustrate the basic principles." And they do. If you've got a class of kids that you've got to teach on subjects like this, it would be well worth seeing if Michael has done a relevant animation. And if he hasn't, I'm sure that he could be persuaded to consider creating one.

The Four Stroke Engine is available from PD Soft; if you want to contact Michael directly, write to him at 7 Lea Vale, Crayford, Kent DA1 4DL.

Program rating.....................8/10

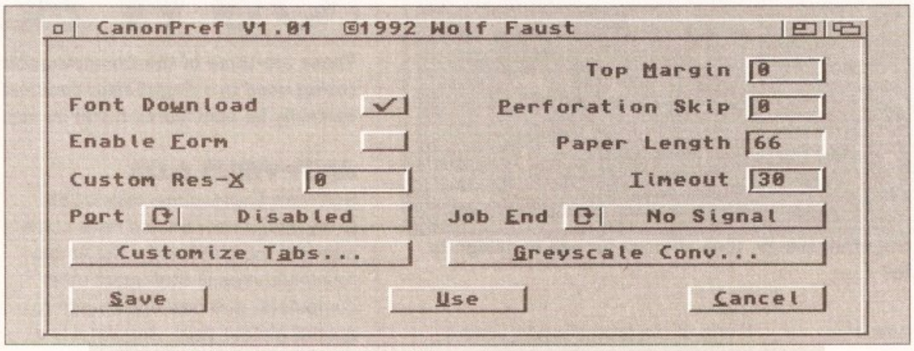
PRINTER DRIVERS V4.0

PD Soft disk V724

This disk contains a range of printer drivers, along with some separate Preferences programs for Canon printers which enable you to control additional options such as paper margin, timeout, grey scale conversion, custom tabs stops, default typeface and more. It also includes *FontShop*, a program by Wolf Faust which enables you to create fonts for downloading to your printer.

The printer drivers included are for the following printers:

- Canon BJ10 and BJ20
- Canon BJ130
- Canon BJ300
- Star 9 Plus (Actually for any 9-pin Epson mode Star printers, this driver improves the speed of graphics dumps and offers more graphic resolutions than the *EpsonX* driver).



PD Soft's *Printer Drivers* version 4.0 has drivers for a range of different devices, as well as ancillary programs to get the best from your printer

If you've got one of these printers, and you're limping along with a standard Commodore driver like *EpsonX*, this disk is a must!

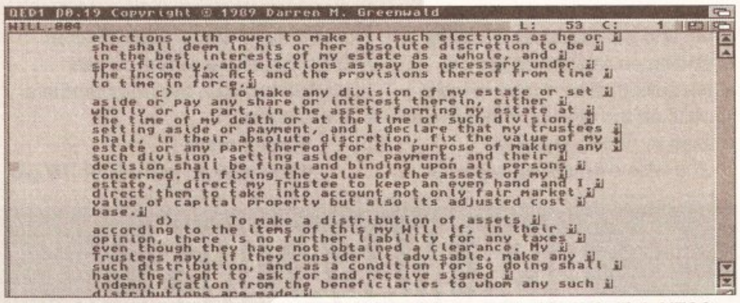
Value for money...9/10

LAST WILL & TESTAMENT

PD Soft disk V706

This disk contains a set of text files written by James Rose, a Canadian, along with *QED*, a text editor by Darren Greenwald, to edit them. And, yes, the text files are all blank wills, for you to cheerfully fill in and file away nice and safely for the time when you pop your clogs and your relatives all get to fight over who gets the carpet in the living room.

The documents were originally created on a PC, but they have now been converted for the edification of



If the party of the first part... *Last Will and Testament*, PD Soft disk V706, should make fun bed time reading

the Amiga community.

There are 14 complete wills on the disk, along with a codicil, a cover page, an affidavit of execution for your will witnesses and a form for power of attorney.

James is, apparently, an authority on this subject, and has even lectured on it. (He lectures on wills? My, that must be interesting...) He has also, according to the documentation, "made wills for many, many people." We all have to make our money somehow, I suppose...

Although the law of different countries means that the actual format and wording of a will varies depending on where it is written, James says that he's tried to word the wills on the disk so that they can be used in "most all areas."

The wills themselves seem to cover just about every possible eventuality, and the descriptions are almost as tortuous as the actual legal wording of the will. For instance, here's the description of one of the wills, as found in the documentation file:

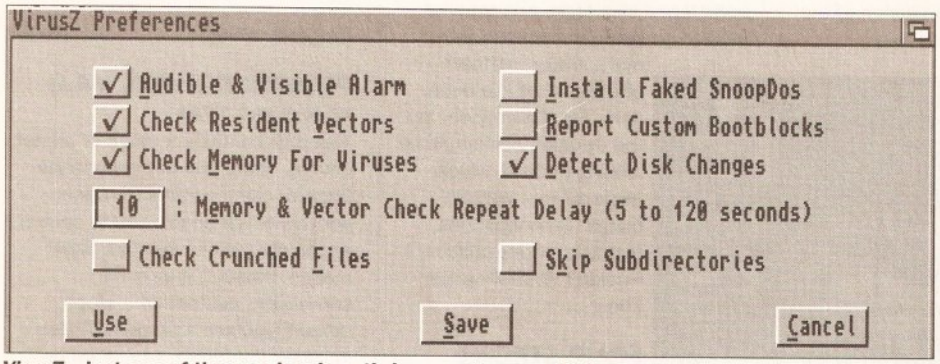
"Will by wife leaving everything to her husband, and since the couple have no children, if the husband dies before the wife leaving everything, in equal parts, to the brothers and sisters of the husband and wife, and if one of the brothers and sisters dies before the death of the husband, the share of that brother or sister will go to his or her children, and if there are no such children then that share will be equally divided between the living brothers and sisters."

Simple, really...

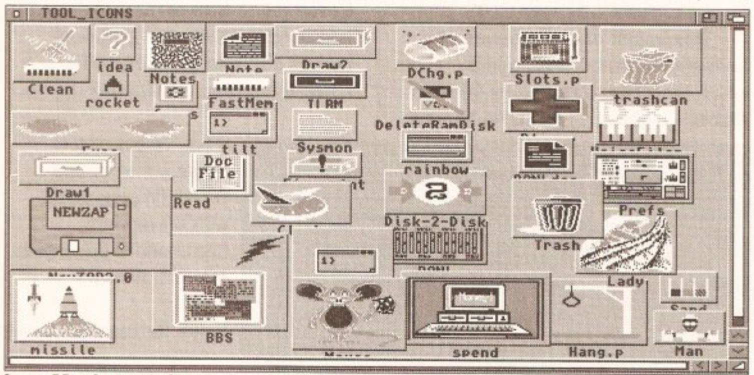
If you want to use any of the pre-prepared wills you must pay a registration fee of $10, or $25 if you want to take advantage of reduced rate consultations and other goodies with the good Mr Rose.

It almost seems easier to die intestate...

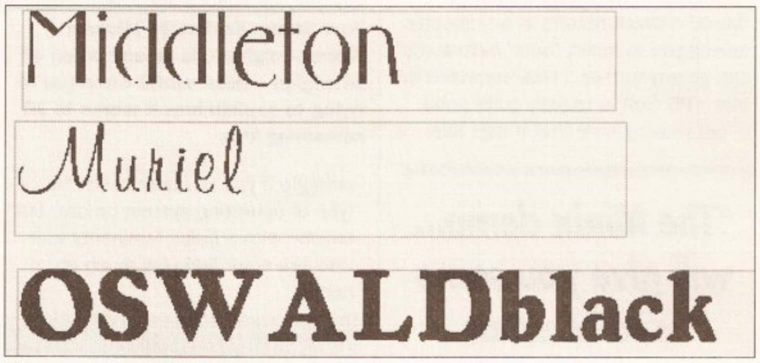
Value for money (assuming the party of the first second agrees that the party of the first part, having reviewed this program, is competent so to do, and that the content of the disk is actually required by the party of the second part, after which let's all go and have a party to recover).........8/10



***VirusZ* – just one of the very handy anti-virus programs on Software Expressions disk U155**



***Icon Mania* contains, among other things, tons of icons for you to assign to your own programs and files**



These are three of the CompuGraphic fonts supplied on PD Soft disk V713 (being used in a *PageSetter* document). They are good quality, and should certainly be considered if you do any DTP work

ANTI-VIRUS 6.04

Software Expressions disk U155

Every Amiga user should have some anti-viral tools at hand – the Amiga has more viruses than most other computers, and new ones seem to appear almost daily. *Anti-Virus* is a disk compiled by someone called Brains, who claims to update it on a weekly basis. Of course, if you don't receive many disks from outside your own work environment, you won't need to update your anti-virus software quite so often, but it's still worth being as up-to-date as possible – and the £1.50 that this disk costs is a small price to pay for peace of mind.

The disk is auto-booting, and brings up a menu of six different anti-virus programs. There is also the documentation file for each program, and an introduction to viruses written by Brains him- (or her-) self. And that's about it, really. The programs on the disk (which include *Boot X*, *Virus Z* and *Virus Checker*) seem to cover everything, and Brains claims that the disk detects every existing virus which has been released up until the disk's creation date. Get it now.

Value for money.................10/10

ICON MANIA

PD Soft disk V730

Icon Mania is a disk which should satisfy anyone with a burning desire to customise every icon within reach. It contains a large number of different icons which you can use in place of your normal boring ones. In addition, there are some programs which will ease the creation and use of your own.

The separate programs include *Icon Maker*, which converts icons into IFF files, so that you can edit them in programs such as *DPaint*, and converts IFF files into icons, so that once you've edited an image you can actually use it; *IconiZer*, which lets you choose different pointers at

continued on page 164

DISK MAGAZINES

DEADLOCK

Issue 3

The first disk magazine this month was created by four Amiga coding groups: The Guru Masters, Metanoia, Prodigy and Dimension-X. Together, they call themselves Rapier International.

The magazine is certainly one of the better-looking ones that I've seen. It has a well-designed interface, and the music isn't at all bad (although, contrary to the instructions, I couldn't turn it off). There is no PD on the disk; it consists totally of articles written by the coders themselves and anyone else who wants to write in.

I still have reservations about some of the content – bad language, off-colour jokes and the like. However, I thought I'd mention it this month – especially since there's a piece in it complaining that I criticised it a couple of issues ago! Yes, guys, I still think that you don't need poor jokes and four-letter words all over the place, but the inclusion of some well-written and interesting articles on subjects like music, modem reviews, coding tutorials and the like make this mag more worthwhile.

The serious pieces are (for the most part) well-written and well thought-out; some wouldn't be out of place in a magazine like *Amiga Shopper*.

If you want an interesting and relatively entertaining read, and assuming that you won't be offended by four-letter words, you could do worse than check out *Deadlock*.

The magazine is available from Guru Masters HQ, 111 Sherborne Road, Bushbury, Wolverhampton, West Midlands WV10 9EU. Enclose a blank disk and an SAE with adequate postage. The disk is public domain, so it can be passed around but not sold – which means that you shouldn't be able to get it from PD houses.

Value for money 8/10

continued on page 164

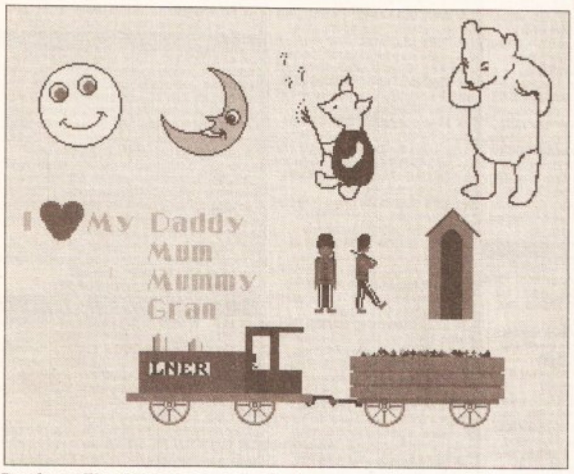
continued from page 162

will, just by double-clicking on their icons; *XIcon*, the popular program which assigns an icon to a Shell script; *IconiSer*, which "creates icons for invisible files"; *Handyicons*, which creates a new Workbench menu (for WB1.3 users, which does much the same thing as the Tools menu in WB2.x); and a variety of other icon editing tools.

Personally, I think that all of this is more or less a waste of time; there's little less productive than spending a whole morning customising every icon on your hard disk.

I'm all for an enforced limit on the size of icons, so the bloody Workbench isn't totally obscured by one or two files whose creators think it's really clever to have 1024 x 1024 icons. But maybe that's just me. However, I'm also the person who rates these things, so I'll give this disk...

Value for money..................3/10



Designs like these are supplied on the *X-Stitch* disk. With the help of this disk, all those home-made pin cushions and wall hangings are in easy reach... Presumably they'll appeal to somebody...

COMPU-GRAPHIC FONTS

PD Soft disk V713

This disk contains an assortment of fonts; two dingbat fonts and three 'conventional' fonts. Workbench 2.x owners, who can use CompuGraphic fonts, will know that it's not easy to get hold of PD or shareware fonts; these were created from PD PostScript fonts (which are much more widely available) using the *Font Manager* program which comes with *Professional Page 3.0*. They are pretty good quality (although, in general, PD fonts aren't nearly as professional-looking as commercial ones), and you should certainly consider getting hold of them if you do any DTP work.

Value for money 8/10

X-STITCH 2.2

Deja Vu disk L/42

X-Stitch, by Jeff Tullin, is an AMOS program which lets you turn an IFF into something called a "counted cross stitch pattern". For all the knitters out there, this pattern could also, apparently, be used for some types of knitting.

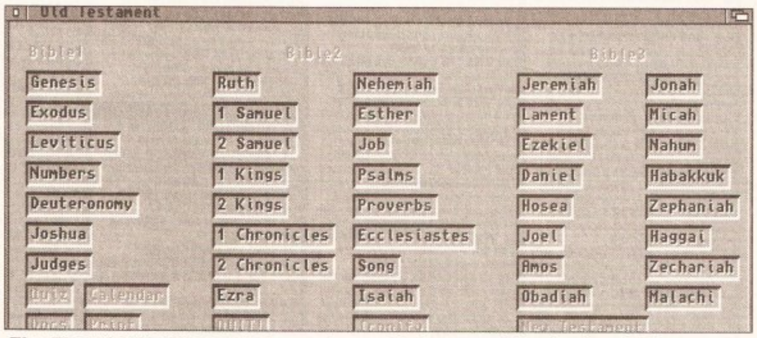
The *X-Stitch* disk contains a selection of images including letters, children's designs and flowers, so you can use these to create your own design.

The program is very easy to use; you select the area that you want to use by click-dragging a marquee, you select the colour of the cloth by clicking on an area of the requisite colour, and you can name the colours of thread used – since the final print-out consists of a table of numbers, and the program can print a reference chart which equates numbers to thread names.

There are, I am assured, hundreds of thousands of cross-stitchers. I'm prepared to believe this – after all, Future Publishing publishes two successful magazines in this area. The problem is, as you narrow the category, the numbers reduce. There are presumably far fewer cross-stitchers who own Amigas. And there are probably even fewer who want to use Amiga IFF pictures as the basis for a cross-stitch design.

In any case, if you happen to be one of the individuals who falls into the latter group, you should probably get hold of this program. The rest of us should definitely avoid the perils of *X-Stitch*.

Program rating.....................8/10



***The Electric Word* is a quick way to navigate around the books of The Complete Bible. Was God an Amiga user? I think we should be told...**

> **"I'm sure that The Complete Bible is just the thing for all those techno-vicars out there..."**

THE COMPLETE BIBLE

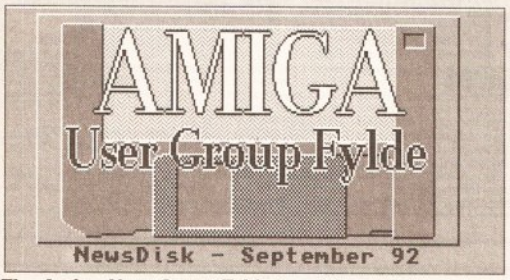
PD Soft disks V715-717

This is a three-disk set which contains... oh hell, you work it out. Because it's a three-disk set, there's an option to install the whole caboodle on to a hard disk, if you've got one. So I did...

Unfortunately, not only was the relevant software copied, but so were all the other bits: C directories, libraries, commands, device

continued on page 166

DISK MAGAZINES (CONTINUED)



The Amiga User Group Fylde provides all the news you need on disk...

continued from page 162

AMIGA USER GROUP FYLDE

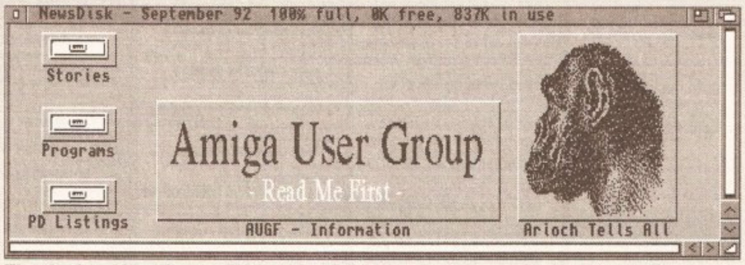
NewsDisk 8 – September 1992

Issue 8 of the Amiga User Group Fylde newsletter-on-a-disk is up to the usual high standard, and is totally packed – 100% full, 837K in use.

Unlike many other disk mags these days, it requires that you have Workbench loaded – it's not self-booting.

The disk consists of an introductory editorial, reviews, articles, tips, nine PD and shareware programs and a list of the group's PD library.

All the text files and graphics open in FullView when double-clicked; it's nice to see that the editor of the mag, Andy Wilkinson, has gone to the trouble of making sure that there's some kind of consistency here. All too often I get PD disks that try to reference non-existent file readers, or which don't have any tool attached at all.



The Amiga User Group Fylde NewsDisk is neatly organised and neatly written. It's one of the most consistently good disk mags that I've seen

The articles are generally well written and edited, and this month range from setting up a hard drive, through Amigas in business to software testing methodologies.

The tips range through such diverse subjects as speeding up the A500 to a mod which allows you to connect both a joystick and mouse into port 1, while the programs include a program to convert IBM text files to Amiga format and a set of GVP hard disk utilities.

I'm always impressed with the quality of the AUGF's newsdisk; it just goes to show that you don't need whizzy user interfaces and slick loading screens as long as your content is up to scratch.

If you want to become a member of the AUGF, it'll cost you £15 for a year, which includes 12 issues of the newsdisk.

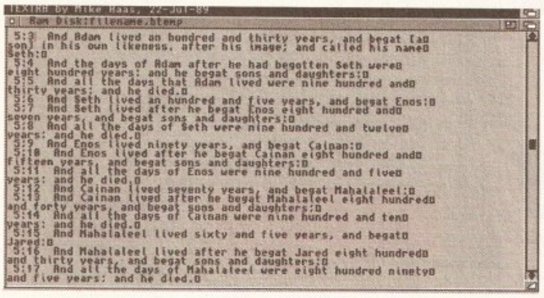
Send cheques, payable to Andy Wilkinson, to him at 25 Glen Eldon Road, St Annes on Sea, Lytham St Annes, Lancashire FY8 2AX.

Value for money 8/10


CITIZEN
DOT MATRIX INK JET AND NOTEBOOK PRINTERS
ALWAYS A GOOD IDEA
Silica presents some great offers on the award winning range of high quality matrix printers from Citizen. Each Citizen printer is built in the UK to exacting standards, ensuring superb reliability and output. Our confidence in Citizen's quality is such that we are pleased to include a 2 year guarantee with every printer. Plus, if you buy a Citizen dot matrix printer from us, we will give you the Silica Printer Starter Kit (worth £29.38), FREE OF CHARGE!
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Silica offer a 2 year warranty (including the dot matrix printer head) with every Citizen printer.
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Free Windows 3.0 driver. Included with the Silica Starter Kit.
FREE COLOUR KIT
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Technical support helpline open during office hours.
MADE IN THE UK
Citizen printers are manufactured to high standards.
LOW PRICE 9 PIN PRINTER
CITIZEN 120D+
144 CPS 80 COLUMN
• Citizen 120D+ - 9 pin - 80 column
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• Epson and IBM Emulation
• Pull tractor & bottom feed
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RRP £199
SILICA STARTER KIT £25
TOTAL VALUE: £224
SAVING: £109
SILICA PRICE: £115
The Citizen 120D printer comes supplied with a parallel interface as standard. If you require a serial interface instead, please state ref: PRI 2125 when placing your order with Silica.
9 PIN PRINTERS
NEW LOW PRICE!
FREE COLOUR KIT
300 CPS 80 COLUMN
• Citizen Prodot 9 - 9 pin - 80 column
• 300cps Draft, 60cps NLQ
• 8K Printer Buffer + 3 Fonts
• Parallel Interface
• Graphics Resolution: 240 x 240dpi
• Epson and IBM Emulation
• FREE Colour Kit
• FREE Silica Printer Starter Kit
RRP £189
COLOUR KIT £41
STARTER KIT £25
TOTAL VALUE: £255
SAVING: £76
SILICA PRICE: £179
£179
+VAT= £210.33 ref: PRI 2319
FREE! - ON REQUEST CITIZEN AMIGA PRINT MANAGER
FREE COLOUR KIT
192 CPS 80 COLUMN
• Citizen Swift 9 - 9 pin - 80 column
• 192cps Draft, 48cps NLQ
• 8K Printer Buffer + 3 Fonts
• Parallel Interface
• Graphics Resolution: 240 x 240dpi
• Epson and IBM Emulation
• FREE Colour Kit
• FREE Silica Printer Starter Kit
RRP £239
COLOUR KIT £38
STARTER KIT £25
TOTAL VALUE: £302
SAVING: £113
SILICA PRICE: £189
£189
+VAT= £222.08 ref: PRI 2209
192 CPS 136 COLUMN
• Citizen Swift 9x - 9 pin - 136 column
• 192cps Draft, 48cps NLQ
• 8K Printer Buffer + 3 Fonts
• Parallel Interface
• Graphics Resolution: 240 x 240dpi
• Epson and IBM Emulation
• Colour Option Available
• FREE Silica Printer Starter Kit
RRP £329
STARTER KIT £25
TOTAL VALUE: £354
SAVING: £105
SILICA PRICE: £249
£249
+VAT= £292.58 ref: PRI 2309
24 PIN PRINTER
FREE! - ON REQUEST CITIZEN AMIGA PRINT MANAGER
NEW! SWIFT 2 SERIES
SWIFT 240M
MONO PRINTER
(COLOUR OPTION AVAILABLE)
SWIFT 240C
COLOUR PRINTER
300 CPS 80 COLUMN
• Citizen Swift 240/240C - 24 pin - 80 column
• 300cps SD (15cpi), 240 cps Draft, 80cps LQ
• 8K Printer Buffer - 40K maximum
• 9 LQ Fonts + 2 Scalable Fonts (8-40pts)
• 1 x Font Cartridge Slot - for plug in 'Style' Fonts
• Parallel Interface
• Graphics Resolution: 360 x 360 dpi
• Epson, IBM, NEC P20 & CEL Emulations
• Quarter Printing Facility
• Auto Set Facility - Bi-directional I/F, Auto Emulation Detection
• Command Vue IV Front Control Panel
• Ultra Quiet Mode - 44.5 dB(A)
• Colour Printing Standard - Swift 240c, Colour Printing Optional - Swift 240
• FREE Silica Printer Starter Kit
SWIFT 240 MONO
RRP £329
STARTER KIT £25
TOTAL VALUE: £354
SAVING: £115
SILICA PRICE: £239
£239
+VAT= £280.83 ref: PRI 2560
SWIFT 240C COLOUR
RRP £369
STARTER KIT £25
TOTAL VALUE: £394
SAVING: £135
SILICA PRICE: £259
£259
+VAT= £304.33 ref: PRI 2571
24 PIN PRINTERS
FREE! - ON REQUEST CITIZEN AMIGA PRINT MANAGER
FREE COLOUR KIT
192 CPS 80 COLUMN
• Citizen 224 - 24 pin - 80 column
• 192cps Draft, 64cps LQ
• 8K Printer Buffer + 4 Fonts
• Parallel Interface
• Graphics Resolution: 360 x 360dpi
• Epson and IBM Emulation
• FREE Colour Kit
• FREE Silica Printer Starter Kit
RRP £269
COLOUR KIT £38
SILICA STARTER KIT £25
TOTAL VALUE: £332
SAVING: £133
SILICA PRICE: £199
£199
+VAT= £233.83 ref: PRI 2484
CITIZEN SWIFT 24X
192 CPS 136 COLUMN
• Citizen Swift 24x - 24 pin - 136 column
• 192cps Draft, 64cps NLQ
• 8K Printer Buffer + 4 Fonts
• Parallel Interface
• Graphics Resolution: 360 x 360dpi
• Epson, IBM and NEC P6 Emulation
• Colour Option Available
• FREE Silica Printer Starter Kit
RRP £489
SILICA STARTER KIT £25
TOTAL VALUE: £514
SAVING: £165
SILICA PRICE: £349
£349
+VAT= £410.08 ref: PRI 2574
INKJET PRINTER
360 CPS 80 COLUMN
• Citizen Projet - inkjet - 80 column
• 360cps Draft, 120cps NLQ
• 50 Nozzle Head - Whisper Quiet 47dB(A)
• 8K Printer Buffer + 3 Fonts
• Optional HP Compatible Font cards
• Parallel Interface
• Graphics Resolution: 300x300dpi
• HP Deskjet plus emulation
RRP £496
TOTAL VALUE: £496
SAVING: £137
SILICA PRICE: £359
£359
+VAT= £421.83 ref: PRI 2090
NOTEBOOK PRINTER
NEW LOW PRICE!
CITIZEN PN 48
64 CPS 80 COLUMN
• Citizen PN48 Notebook Printer
• Non-impact Printing on Plain Paper
• 53cps LQ - 4K Buffer + 2 Fonts
• Rear and Bottom Paper Loading
• Parallel Interface
• Graphics Resolution: 360 x 360dpi
• Epson, IBM, NEC P6 & Citizen Emulation
• Powered From Mains, Battery or Car Adaptor
RRP £325
TOTAL VALUE: £325
SAVING: £106
SILICA PRICE: £219
£219
+VAT= £257.33 ref: PRI 2100
FREE! STARTER KIT WORTH £29.38
This starter kit will help you to get you up and running with your new Citizen dot matrix printer from Silica Systems.
• 3½" Disk - Amiga & ST Drivers
• 3½" Disk - Driver for Windows 3
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• 200 Sheets of Continuous Paper
• 100 Continuous Address Labels
• 5 Continuous Envelope
If you already own a printer, and would like to buy a kit, you may order one (ref: KIT 5001) for £19.38 - £10 off RRP!
AMIGA PRINT MANAGER WORTH £14.10
The Amiga Print Manager dramatically enhances printed output. Provides drivers for all Citizen printers and replaces Amiga's normal printer preference system - printing is quicker, colours more vibrant, graphics less fuzzy. Easy to use with instructions.
Features include:
• Improved Image Smoothing
• Gamma/Colour Correction
• Image Scaling
• Colour Separation
• Reduces/Illiminates Banding
The Amiga Print Manager is available free on request from Silica Systems with the Swift 9, 224 and 240 printers, or may be purchased (ref: ASC 4572) for £13.10 (RRP £14.10).
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PRA 1228 124D/224/Swift 9/24 £42.00
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PRA 1189 120D+ £56.45
PRA 1209 Swift 9/9x/124D/224 £32.25
PRA 1709 Swift 24/24x/24e £26.38
32K MEMORY EXPN
PRA 1753 124D/224/Swift 24 £13.10
PRINTER STAND
PRA 1242 124D/224/Swift 9/24 £24.03
PRA 1274 Swift 9X/24X £30.66
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RIB 3924 124D/Swift 24 Black £4.70
RIB 3936 224/Swift 9/24 Colour £15.63
RIB 3248 PN48 Single Strike £3.61
RIB 3348 PN48 Multi Strike £3.61
COLOUR KITS
PRA 1236 224/Swift 9/24/24e/240 £35.25
PRA 1240 Swift 9x/24x £35.25
PN48 ACCESSORIES
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PRA 1155 PN48 Cable Extn £29.37
PRA 1162 PN48 Car Adaptor £16.80
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• FREE CATALOGUES: Will be mailed to you with offers + software and peripheral details.
• PAYMENT: Major credit cards, cash, cheque or monthly terms.
Before you decide when to buy your new printer, we suggest you think very carefully about WHERE you buy it. Consider what it will be like a few months after you have made your purchase, when you may require additional peripherals and accessories, or help and advice with your new purchase. And, will the company you buy from contact you with details of new products? At Silica Systems, we ensure that you will have nothing to worry about. We have been established for almost 14 years and, with our unrivalled experience and expertise, we can now claim to meet our customers' requirements with an understanding which is second to none. But don't just take our word for it. Complete and return the coupon now for our latest FREE literature and begin to experience the "Silica Systems Service".
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LONDON SHOP: 52 Tottenham Court Road, London, W1P 0BA Tel: 071-580 4000
Opening Hours: Mon-Sat 9.30am-6.00pm No Late Night Opening Fax No: 071-323 4737
LONDON SHOP: Selfridges (1st Floor), Oxford Street, London, W1A 1AB Tel: 071-629 1234
Opening Hours: Mon-Sat 9.30am-6.00pm Late Night: Thursday until 8pm Extension: 3914
SIDCUP SHOP: 1-4 The Mews, Hatherley Rd, Sidcup, Kent, DA14 4DX Tel: 081-302 8811
Opening Hours: Mon-Sat 9.00am-5.30pm Late Night: Friday until 7pm Fax No: 081-309 0017
To: Silica Systems, AMSHP-1192-55, 1-4 The Mews, Hatherley Rd, Sidcup, Kent , DA14 4DX
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Mr/Mrs/Miss/Ms: .... Initials: .... Surname: ....
Company Name (if applicable): ....
Address: ....
.... Postcode: ....
Tel (Home): .... Tel (Work): ....
Which computer(s), if any, do you own? 55H
E&OE - Advertised prices and specifications may change - Please return the coupon for the latest information.

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handlers, disk .info files et al. I would have thought that an installation routine should be



There was a lot of begatting in ancient Biblical times...

intelligent enough to work out that it doesn't need to copy a full Workbench system to the hard drive. Ridiculously enough, the installation procedure then goes back and deletes all the unnecessary files. Nice one.

That niggle out of the way, I double-clicked on *Electric Word*; except that I hadn't run the 'make assigns' program first. How silly of me. Some documentation would have been nice...

Anyway, when I'd finally worked out what was going on, I found that *Electric Word* is a PD program which contains buttons for all the different books in the Bible. Click on one of the buttons and you're taken to that section, opened in *Textra*, a simple document editor which includes a Find facility (vital for searching out the 'number of the beast' bit in Revelations).

And... er... that's about it. The thing does its job (although not incredibly elegantly), it'll work from floppies and it can even run on machines with just 512K. I'm sure that it's just the thing for all those techno-vicars out there. Me, I've already chucked it off the disk.

Program rating....................7/10

WHERE TO GET IT

There are two main ways to get hold of Amiga PD and shareware: from a bulletin board or from a PD library.

The advantage of using a bulletin board is that often the latest software is uploaded as soon as it's available. On the down side, you need a modem to connect, and you'll have to pay phone charges (and sometimes a connection fee to the bulletin board as well).

There are a growing number of bulletin boards with a wide range of Amiga software available for download. Check out 01-for Amiga (071 377 1358) and the Cheam Amiga Bulletin Board (081 644 8714). Another good option is joining CIX (the Compulink Information eXchange), which not only has Amiga software but also contains conference and file areas on a wide range of subjects, from politics to scuba diving, biking to Science Fiction. Many of the *Amiga Shopper* writers have accounts on CIX, so you can get first-hand advice on your problems, too. For more details, call CIX on 081 390 8446 (voice) or 081 390 1255 (modem).

If you don't want to use a bulletin board, the other way to get PD software is from a PD house. Many advertise in *Amiga Shopper*, and you'll find a comprehensive list of names and addresses at the end of this article. Expect to pay between 99p and about £2.50 per disk – there's often a discount if you buy in bulk, too.

UK PD HOUSES

3 Amigos
16 Marsett Way
Leeds LS14 2DN
☎ 0532 733043

Amiganuts United
169 Dale Valley Road
Hollybrook, Southampton

AMOS PD
1 Penmynydd Road
Penlan, Swansea SA5 7EH

Anglia PDL
115 Ranelagh
Felixtowe, Suffolk IP11 7HU
☎ 0394 283494

Blitterchips
Cliffe House, Primrose Street
Keighley BD21 4NN
☎ 0535 667469

CLS
PO Box 7
Bletchley
Milton Keynes, MK2 3YL
☎ 0908 640763

Crazy Joe's
145 Effingham Street
Rotherham
South Yorks S65 1BL
☎ 0709 829286

Deltrax PD
36 Bodelwyddan Ave, Old Colwyn
Clwyd LL29 9NP
☎ 0492 515981

Deja Vu
7 Hollinbrook, Beech Hill
Wigan WN6 7SG
☎ 0942 495261

Digitz
PO Box 144, Mexborough
South Yorks S64 9SL
☎ 0709 571748

EdLib
7 Sampford Brett Lane
Williton
Somerset TA4 4JT
☎ 0984 32320

EMPDL
54 Watnall Road
Hucknall
Nottingham NG15 7LE
☎ 0602 630071

Essex Computer Systems
118 Middle Crockerford
Basildon
Essex SS16 4JA
☎ 0268 553963

George Thompson Services
Cucumber Hall Farm,
Cucumber Lane
Essendon
Herts AL9 6JB
☎ 0707 664 654

Goldstar Computers
PO Box 2
Tyldesley
Manchester M29 7BN
☎ 0942 895320

ICPUG
PO BOX 1309
London N3 2UT
☎ 081-346 0050

Kernow Software PD Library
51 Ennors Road
Newquay, Cornwall

NBS
1 Chain Lane, Newport
Isle Of Wight PO30 5QA
☎ 0983 529594

Neural Images
4 Flint Walk, Hartlepool
Cleveland TS26 0TE
☎ 0429 263508

Office Choice (OC-PD)
30 Town St, Kirkintilloch
Glasgow G66 1NL
☎ 0236 737901

PD Soft
1 Bryant Ave, Southend-On-Sea
Essex SS1 2YD
☎ 0702 466933

Pentire PD
10a Hag Hill Lane, Taplow
Maidenhead, Berks SL6 0JH
☎ 0628 666641

Public Dominator
PO BOX 801, Bishop's Stortford
Herts CM23 3TZ
☎ 0279 757692

Riverdene PDL
30a School Road
Tilehurst, Reading
Berkshire RG3 5AN
☎ 0734 452416

Telescan Computer Services
Handsworth Road
Blackpool FY5 1SB
☎ 0253 22296

Sector 16
160 Hollow Way, Cowley, Oxford
☎ 0865 774472

Seventeen Bit Software
PO BOX 97, Wakefield
West Yorks WF1 1XX
☎ 0924 366982

Software Expressions
Unit 4, 44 Beauley Road
Southville
Bristol BS3 1PY
☎ 0272 637634

Softville
Unit 5, Stratfield Park
Elettra Avenue,
Waterlooville
Hants
PO7 7XN
☎ 0705 266509

Start Computer Systems
20 Holmside
Sunderland
Tyne and Wear SR1 3JE
☎ 091 565 2506

Startronics
4 Arnold Drive, Droylsden
Manchester M35 6RE
☎ 061 370 9115

Unique Computing
114 Salters Road, Gosforth
Newcastle on Tyne, NE3 3UP
☎ 091-284 7976

Vally PD
PO BOX 15, Peterlee
Co Durham SR8 1NZ
☎ 091-587 1195

Wirral PD
PO Box 4, Birkenhead
Merseyside L41 4FW
☎ 051 651 0646

BUYING ADVICE FOR SHOPPERS

Whether buying over the phone or at a local store, here's our advice on how to get what you want

BUYING IN PERSON

- Where possible, always test any software and hardware in the shop before taking it home, to make sure that it works properly.
- Make sure you have all the necessary leads, manuals or other accessories you need.
- Don't forget to keep your receipt.

BUYING BY PHONE

- Be as clear as possible when stating what you want to buy. Make sure you confirm all the technical details of what you are buying. Some things to bear in mind are version numbers, memory requirements, other required hardware or software and compatibility with your particular model of Amiga (that is, make sure you know which version of Kickstart you have).
- Check the price you are asked to pay, and make sure that it's the same as the price advertised.
- Check that what you are ordering is actually in stock.
- Check when and how the article will be delivered, and that any extra charges are as stated on the advert.
- Make a note of the date and time when you order the product.

BUYING BY POST

As with buying by phone, you should clearly state exactly what it is you are buying, at what price (refer to the magazine, page and issue number where it's advertised) and give any relevant information about your system set-up where necessary. You should also make sure you keep copies of all correspondence both to and from the company concerned.

MAKING RETURNS

Whichever method you buy by, you are entitled to return a product if it fails to meet any one of the following three criteria:

- The goods must be of 'merchantable quality'.
- The goods must be 'as described'.
- The goods must be fit for the purpose for which they were sold.

If they fail to satisfy any or all of the criteria, then you are then entitled to:

- Return them for a refund.
- Receive compensation for part of the value.
- Get a replacement or free repair.

When returning anything, ensure that you have proof of purchase and that you return the item as soon as possible after receiving it. For this reason it is important that you check the hardware or software as soon as it is delivered to make sure everything you ordered is there and works as it is supposed to.

HOW TO PAY

Paying by credit card is the most sensible way, whether buying in person, by post or on the phone, because you may be able to claim the money from the credit card company even if the firm you ordered from has gone bust or refuses to help sort out your problem.

Otherwise, you should pay by crossed cheque or postal order – never send coins or notes through the mail.

GETTING REPAIRS

Always check the conditions of the guarantee, and servicing and replacement policy, so that you know what level of support to expect. Always fill in and return warranty cards as soon as possible, and make sure that you are aware of all the conditions contained in the guarantee.

BUYING PD

Even though PD software is relatively inexpensive, you should still apply the guidelines set out above, making sure that you confirm all orders as clearly as possible.

Shopping around is still important when buying PD because different houses charge different prices for the same disks. There is no set pricing structure for disks, but bear in mind that PD houses are, in theory, supposed to be non-profit making operations. AS

A CHECK LIST FOR MAIL ORDER BUYING

1 **Make sure you know exactly what you want. Draw up a checklist of the specifications you are looking for and what you want it to be able to do. Check with the suppliers that their product matches your list**

2 **Will the product you have in mind work with your existing set-up, and anything else you are planning to buy?**

3 **Can you see a demonstration? Many products are on display at computer shows around the country.**

4 **Are there any hidden extras? Does it need 1Mb to run, or a hard disk?**

5 **What technical support is provided by the supplier? Does the manufacturer offer after-sales advice? Check before you buy.**

6 **Check the guarantee terms. How long is the free warranty? What does it offer?**

7 **Draw up a list of these details and make them a condition of your order.**

8 **Check the price and delivery details when you order, and make a note of them.**

9 **Note down when you placed the order and who you spoke to.**

10 **When it arrives, check everything carefully. If anything is missing, don't use the product at all – contact the supplier. If it doesn't work, make the obvious checks such as the fuse. If it still doesn't work don't try to fix it – contact the supplier.**

ADVERTISERS INDEX

PRODUCTS

PRODUCT LOCATOR

HARDWARE • HARDWARE • HARDWARE • HARDWARE • HARDWARE • HARDWARE • HARDWARE • HARDWARE

Welcome to the *Amiga Shopper* Buyer's Guide, your regular guide to what's hot and what's not in the Amiga market place. It's designed as a simple-to-use yet comprehensive guide which will help you to make the right buying decisions. It may not include each and every product ever produced for the Amiga (that would take up virtually the whole of *Amiga Shopper*!), but you can rest assured that all major brands and models are here.

The Buyer's Guide will run each and every month and as new products are released and others discontinued, we'll be updating it accordingly. This month we bring you what is possibly the most comprehensive guide to hardware for the Amiga owner. Next month we'll be listing Amiga software...

AMIGAS

Model	Price	Memory	Total Chip	Total Fast	Processor	Speed (MHz)	Hard Disk (Mb)	Floppies	Comment
A600	£299	1 Mb	2Mb	4Mb	68000	7	No	1x880k	Replacement for now discontinued A500 Plus
A600HD	£499	1 Mb	2Mb	4Mb	68000	7	20	1x880k	A600 with built-in 20Mb IDE
A1500	£999	1 Mb	1 Mb	9 Mb	68000	7	No	2x880k	More expandable than A500
A2000HD	£1299	1 Mb	1 Mb	9 Mb	68000	7	40	1x880k	Exactly the same as A1500, but now includes hard disk
A2500	£????	1 Mb	1 Mb	9 Mb	68020	16	40	1x880k	Same as A2000HD, but comes with processor card
A3000	£3160	2 Mb	2 Mb	16 Mb	68030	16/25	50/100	1x880k	Available in several hard disk/processor configurations

Note: A500 and A1500 now denote 2.0-based machines. A2500 only available in the US.

HARD DRIVES

Model	Supplier	Price	Machine	Capacity (Mb)	RAM Expansion	Rating	Issue
RocHard	Zye Technology	£379	A500	52	8 Mb	****	13
Impact II+	Silica	£399	A500	50/110	8 Mb	*****	1,2,8,13
A590	Commodore	£399	A500	20	2 Mb	***	1,2,8,13
DataFlyer500	Trilogic	£350	A500	48	-	**	1,2,8,13
500XP	Surface UK	£489	A500	40	2/8 Mb	****	1,2,8,13
FastTrak	Third Coast	£599	A500	40	-	***	8
Novia 30i	Power Computing	£399	A500	20/30	-	***	8
Prima	Power Computing	£499	A500	50/100	-	****	8
Trumpcard	Third Coast	£399	A500	40	-	***	8
Protar HD	Protar	£299	A500	20	8 Mb	****	-
Impact IIHC+8	Silica	£299	A1500→	40-300	8 Mb	****	1,2,13
DataFlyer2000	Trilogic	£350	A1500→	48	-	***	1,2
WordSync2000	Surface UK	£450	A1500→	52	-	****	1,13
A2091-40	Commodore	£200	A1500→	40	-	**	8,13
Nexus HC	Power Computing	£350	A1500→	40	8 Mb	****	8,13
SysQuest	Omega Projects	£690	SCSI	88	-	****	8
OpticalDrive	Power Computing	£1199	SCSI	128	-	****	-
TapeStreamer	Omega Projects	£600	SCSI	150	-	*****	-

NOTE: Trumpcard can be used on both A500 and A1500+

EXTERNAL DRIVES

Model	Supplier	Price	Machine	Size	Capacity	Disable Switch	Rating	Issue
PC880B	Power Computing	£55	Any	3 1/2"	880K	Yes	*****	8
RF332C	Silica Systems	£60	Any	3 1/2"	880K	Yes	****	0,1,2,8
RF542C	Silica Systems	£80	Any	5 1/4"	880K	Yes	****	0,1,2,8
A1011	Commodore	£100	Any	3 1/2"	880K	No	***	0,1,2,8
Zydec	Evesham Micros	£55	Any	3 1/2"	880K	Yes	***	8
CAX354	Cumana	£75	Any	3 1/2"	880K	Yes	****	0,1,2,8
3A-1D	Golden Image	£65	Any	3 1/2"	880K	Yes	****	0,8
AEHD	Applied Engineering	£140	Any	3 1/2"	1.52 Mb	No	*****	8
Internal2000	Power Computing	£50	A1500→	3 1/2"	880K	No	****	8
DualDrive	Power Computing	£120	Any	3 1/2"	2x880K	Yes	****	0,1,2,8
Floptical Disk	Digital Micronics	£650	Any	3 1/2"	20 Mb	Yes	*****	8

NOTE: PC880B comes with built-in disk copier. Floptical Disk not yet available in UK.

RAM EXPANSIONS

Model	Supplier	Price	Machine	Size	Max Size	Power Supply?	Fitting	Rating	Issue
500RX	Surface UK	£198	A500	2 Mb	8 Mb	Optional	Expansion Bus	*****	5
ProRAM Plus	Datel	£25	A500	512k	-	-	TrapDoor	***	8
RAM-Master 2	Datel	£100	A500	1.5 Mb	-	-	TrapDoor	***	-
V2000	Virgo	£104	A500	2 Mb	-	-	TrapDoor	*****	-
Zydec1.5	Zydec	£79	A500	1.5 Mb	-	-	TrapDoor	****	-
BaseBoard	EPD	£300	A500	4 Mb	-	-	TrapDoor	****	-
Ashcom512k	Ashcom	£35	A500	512k	-	-	TrapDoor	****	8
Ashcom1.8Mb	Ashcom	£155	A500	1.8 Mb	-	-	TrapDoor	****	-
Cortex2	Cortex	£199	A500	2 Mb	8 Mb	Yes	Expansion Bus	*****	8
GVP Series2	Silica	£159	A1500→	2 Mb	8 Mb	-	Card	*****	-
A2058	Commodore	£159	A1500→	2 Mb	8 Mb	-	Card	****	8
AdRAM2000	Power Computing	£179	A1500→	2 Mb	8 Mb	-	Card	****	8
Cortex2000	Cortex	£175	A1500→	2 Mb	8 Mb	-	Card	*****	8

PROCESSOR ACCELERATORS

Model	Supplier	Price	Machine	Processor	Speed	Max 32-bit RAM	Maths Co-pro	Rating	Issue
38 Special	Omega Projects	£850	Any	68030	38 MHz	8 Mb	68881	****	13
40/4 Magnum	Omega Projects	£NA	A1500→	68040	28 MHz	16 Mb	68882	*****	13
Zeus	Power Computing	£1449	A1500→	68040	28 MHz	64 Mb	68882	*****	14
040/500	Power Computing	£725	A500	68040	28 MHz	8 Mb	68882	*****	14
040/500i	Power Computing	£NA	A500	68040	28 MHz	16 Mb	-	****	14
Mercury	Power Computing	£1249	A3000	68040	28 MHz	32 Mb	68882	*****	14
G-Force	Silica	£599	A1500	68030	25 MHz	16 Mb	68881	****	15
Turbo68000	Bytes&Pieces	£45	A500	68000-16	16 MHz	-	No	**	-
AdSpeed	Silica	£173	A500	68000-16	16 MHz	-	No	****	3,5
VXL-30	ZCL Ltd	£409	A500	68030	25 MHz	8 Mb	Yes	****	-
2000/40	Marcam	£1937	A1500→	68040	50 MHz	32 Mb	Yes	*****	-
A3001	Silica	£1799	A1500→	68030	50 MHz	32 Mb	Yes	*****	3,5
G-Force	Silica	£1999	A3000	68040	28 MHz	-	-	*****	-
FusionForty	Power Computing	£1999	A1500→	68040	50 MHz	32 Mb	Yes	****	-
CSA MegaMidget	Bytes&Pieces	£389	A500	68030	33 MHz	8 Mb	Yes	****	3,5
A5000-16	Solid State	£295	A500	68020	16 MHz	4 Mb	Yes	*****	-
B5000-25	Solid State	£595	A500	68020	25 MHz	16 Mb	Yes	****	3,5
B5000-40	Solid State	£1162	A1500→	68030	40 MHz	32 Mb	Yes	*****	-
Harms Pro30	Bytes&Pieces	£1099	A1500→	68030	28 MHz	4 Mb	Yes	***	3,5
A2630	Commodore	£1200	A1500→	68030	25 MHz	4 Mb	Yes	****	-

NOTE: Although some 68030 cards appear to run faster than their '040 equivalents, this may not necessarily be the case. All '040 cards will run faster internally.

SCANNERS

Model	Supplier	Price	Machine	Type	Colour	Resolution	Rating	Issue
GT-6000	Epson UK	£1300	Any	Flatbed	Yes	600dpi	*****	17
DaataScan 2GS	Pandaal	£125	Any	Hand Held	No	400dpi	***	14
Power Scanner 2	Power Computing	£99	Any	Hand Held	No	400dpi	*****	14
AlfaScan	Golden Image	£199	Any	Hand Held	No	400dpi	*****	14
Handy Scanner	Pandaal	£140	Any	Hand Held	No	400dpi	***	14
Sharp JX-100	Silica	£695	Any	Hand Held	Yes	200dpi	*****	-
GeniScan	Datel	£130	Any	Hand Held	No	400dpi	***	-
GoldenImage	GoldenImage	£150	Any	Hand Held	No	400dpi	*****	5

PRODUCT LOCATOR

Sharp JX-300	Silica	£3600	Any	FlatBed	Yes	300dpi	*****	-
Pandaal Scanner	Pandaal	£180	Any	Hand Held	No	400dpi	****	3
PowerScanner	Power Computing	£99	Any	Hand Held	No	400dpi	***	11

DIGITISERS

Model	Supplier	Price	Realtime	Colour	Realtime Colour	Animation	Rating	Issue
DgiTiger II	SA&H	£200	No	Yes	No	No	****	17
V-Lab	ACS	£300	Yes	Yes	Yes	No	****	17
DigiView 4	Silica	£150	No	Yes	No	No	****	-
ColourPic	JCL	£399	Yes	Yes	Yes	No	****	2
VIDIAmiga	Rombo	£130	Yes	Yes	No	Yes	****	5
Videon	Power Computing	£200	No	Yes	No	No	***	-
FrameGrabber	Marcam	£599	Yes	Yes	Yes	Yes	*****	-
VideoDigitiser	Datel	£80	Yes	Yes	No	No	****	-

SOUND SAMPLERS

Model	Supplier	Price	Stereo	Volume Adjust	Resolution	Rating	Issue
StereoMaster	MicroDeal	£40	Yes	Yes	8-bit	****	11
TechnoSound	New Dimensions	£35	Yes	No	8-bit	****	5
Audio Engineer	HB Marketing	£199	Yes	Yes	8-bit	*****	5
Perfect Sound 3	HB Marketing	£60	Yes	Yes	8-bit	***	10
SampleStudio 2	Datel	£70	Yes	No	8-bit	**	-
Sound Master	HB Marketing	£130	Yes	Yes	8-bit	*****	-
MicroSampler	Datel	£25	Yes	No	8-bit	*	-
SoundTrap 3	Omega Projects	£30	No	No	8-bit	****	3
AMAS 2	MicroDeal	£100	Yes	Yes	8-bit	****	-
StereoSampler2	Trilogic	£40	Yes	Yes	8-bit	****	-
GVP DSS	Silica	£60	Yes	Yes	8-bit	****	3
AD1012	HB Marketing	£TBA	Yes	Yes	12-bit	*****	-
AD1016	HB Marketing	£TBA	Yes	Yes	16-bit	*****	-
Audition 4	HB Marketing	£49	Yes	Yes	8-bit	****	10
Audio Sculpture	SMG	£49	Yes	Yes	8-bit	**	12

NOTE: AD1012 and AD1016 are for A1500→ only

GENLOCKS

Model	Supplier	Price	Fade	Dissolve	S-VHS	RGB Pass thru	Rating	Issue
Hama 290	Hama PVAC	£749	Yes	Yes	Yes	Yes	****	16
MicroGen	Power Computing	£199	Yes	Yes	No	Yes	****	-
MiniGen	ASAP	£99	No	No	No	No	**	-
RocGen	Silica	£117	Yes	Yes	No	No	****	8
RocGen+	Silica	£199	Yes	Yes	No	Yes	****	10
A8802	Marcam	£139	No	No	No	Yes	***	-
8802 FMC	Marcam	£178	Yes	No	No	Yes	***	-
A8802S-VHS	Marcam	£499	Yes	Yes	Yes	Yes	***	10
A8806	Marcam	£499	No	No	No	Yes	*****	-
GST Gold	Third Coast	£550	Yes	Yes	Yes	Yes	****	-
VideoCentre2	G2	£1170	Yes	Yes	Yes	Yes	****	-
VideoCentre3	G2	£1999	Yes	Yes	Yes	Yes	****	7
VideoMaster VM-2	Power Computing	£799	Yes	Yes	Yes	Yes	***	1
Videocomp G-100	Silica	£1800	Yes	Yes	Yes	Yes	*****	3
ImageMaster	Neriki	£1150	Yes	Yes	Yes	Yes	***	-
ProGen	Gordon Harwood	£130	No	No	No	Yes	***	-

COLOUR CARDS

Model	Supplier	Machine	Price	Type	Colour Palette	Max Resolution	Rating	Issue
Rembrandt	Power Computing	A1500→	£1499	24-bit	24-bit	1024x1024	****	13
AVideo 12	Checkmate	A1500→	£299	12-bit	12-bit	768x580	***	13
AVideo 24	Checkmate	A1500→	£599	24-bit	24-bit	768x580	****	15
HAM-E	Checkmate	A500	£299	Pseudo	24-bit	368x580	*****	8
DCTV	Silica	A500	£499	Pseudo	24-bit	368x580	****	12
GVP IV-24	Silica	A1500→	£1799	24-bit	24-bit	910x576	****	12
Harlequin	ACS	A1500→	£1400	24-bit	24-bit	910x576	*****	11

NOTE: A500 devices can be used on all Amigas

TOUCH TABLETS

Model	Supplier	Price	Size	Resolution	Rating	Issue
Podstat PT-3030	HB Marketing	£179	9x12"	*****	*****	-
Genitizer	Datel	£130	9x6"	****	****	-
Cherry Mk4	Cherry	£450	9x12"	*****	***	-

DOT-MATRIX PRINTERS

Model	Supplier	Price	Pins	Speed(CPS)	Fonts	Buffer	Rating	Issue
200	Citizen	£250	24	240	7	8K	****	-
240C	Citizen	£350	24 (colour)	240	9	8K	*****	-
P20	NEC	£351	24	115	8	8K	****	4
L24d	Citizen	£292	24	109	3	8K	****	4
Swift 9	Citizen	£280	9	121	3	8K	*****	4
Swift 24	Citizen	£428	24	121	5	8K	****	4
LX850	Epson	£269	9/24	106	3	4K	***	4
LQ400	Epson	£269	24	121	3	8K	****	4
LQ550	Epson	£375	9	109	4	8K	***	4
LC200	Star	£304	24	91	4	16K	****	4
LC24	Star	£304	24	130	5	16K	****	4
ML380	Oki	£386	24	127	3	8K	****	4

MISCELLANEOUS HARDWARE

Model	Supplier	Price	Type	Rating	Issue
ICD KickBack	Silica Systems	£27	Keyboard swtchable ROM sharer	*****	-
RocKey	Silica Systems	£350	Chromakey for RocGen Plus genlock	N/A	-
Golden Gate	Silica Systems	£N/A	25MHz 80386 PC Emulator for Amiga 1500+	****	-
I/O Port	SwitchSoft	£28	Electronics Projects kit	****	17
Sound Enhancer	Omega Projects	£40	Improved Amiga sound capabilities	*****	-
Kickswitch	Omega Projects	£25	Keyboard switchable ROM sharer	*****	-

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ACS	031 557 4242	Cumana	0483 503121	Gordon Harwood	0773 836781	Oki	0753 31292	Solid State Leisure	0933 650677
App.Engineering	0101 214 241 6060	Datel Electronics	0782 744707	HB Marketing	0753 686000	Omega Projects	0702 466933	Star	0494 471111
ASAP	0724280222	Digital Micronics	0101 619 431 8301	JCL Business Systems	0892 518181	Pandaal Marketing	0234 855666	Surface UK	081 566 6677
Ashcom	0530 411485	EPD	0602 841640	Marcam Ltd	0604 790466	Power Computing	0234 273000	Switchsoft	0325 464423
Bytes & Pieces	0253 734218	Epson UK	0442 61144	MicroDeal	0726 68020	Protar	0923 54133	Third Coast Technologies	0257472444
Checkmate Digital Ltd	071 923 0658	Evesham Micros	0386 765500	Naksha UK	0925 56398	Rombo	0506 414631	Trilogic	0274 678062
Citizen	0895 72621	G2 Video Systems	0252 737151	NEC	081 993 9831	SA & H	010 40 0511 551701	Virgo	0276 676308
Commodore	0628 770088	Gasteiner	081 365 1151	Neriki	081 900 1866	Silica Systems	081 309 1111	WTS Electronics	0582 491949
Cortex	051 236 0480	Golden Image	081 518 7373	New Dimensions	0291 690933	SMG	0274 562999	ZCL Ltd	0543 251275

WIN • WIN • WIN • WIN • WIN • WIN • WIN • WIN

Up for grabs – two Philips monitors

We have two of its excellent monitors to give away, each worth £199. And two lucky runners-up will receive a radio controlled car!

Philips CM8833/II stereo colour monitor has become pretty much a standard in the Amiga world, and rightly so. Of course we in the *Amiga Shopper* office are well looked after – we already have Philips monitors. But many of you out there must be struggling with modulators and TVs with dodgy tubes. So, being the generous souls that we are, we've persuaded Philips to donate two monitors for us to give away. Just think of it – no more eye-strain!

And that's not all. We've got two smashing bright red Ferrari Testarossa radio control cars to give away as runner-up prizes. These cars are great fun; they've already started quite a racing fad at the office.

What's the connection between monitors and racing cars, you must be wondering. It's all part of Philips' new promotion. Each monitor comes with a copy of Gremlin Graphics' *Lotus Turbo Challenge II* game, and every purchaser (or winner of *this* competition) can enter Philips' competition. Each month 10 lucky people will win one of the above mentioned Ferraris; and the overall winner will get two tickets for the Silverstone Grand Prix, complete with helicopter trip, grandstand seats and a chance to meet a Formula One personality.

Send your answers to the questions below on the back of a postcard or sealed envelope to:
Racey chasey heart
Amiga Shopper
29 Monmouth Street
Bath BA1 2DL
The closing date is November 9. Only one entry per household. AS

THE CHALLENGE

QUESTION 1

What do the letters RGB stand for?

a) Really Good Brightness
b) Relatively Geared Balance
c) Red Green Blue

QUESTION 2

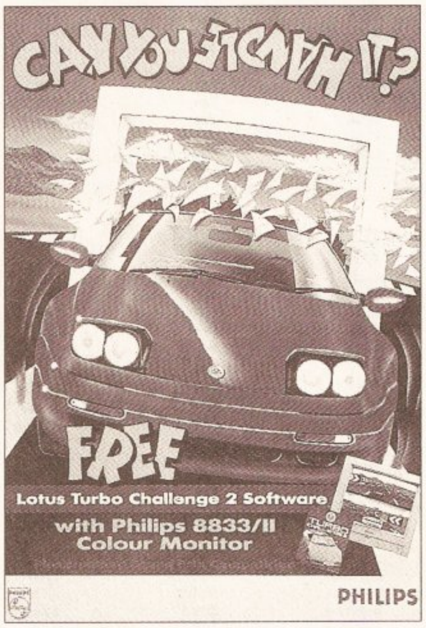
Who won the 1991 Formula One World Championship?

a) Ayrton Senna
b) Bobby Charlton
c) Nigel Mansell

QUESTION 3

Which Argentinian racing driver drove a Ferrari to a Formula One World Championship?

a) Ayrton Senna
b) Juan Fangio
c) Mario Andretti



Enter this month's competition and feast your eyes on one of these – Philips' CM8833/II monitor is a roaring success. Sharp clarity and stereo sound are two of its features... but we can't guarantee its resistance to cars

MASTERING MAGIC WINNERS

The answers for last month's competition were as follows...

- **Mark Smiddy is the master of AmigaDOS.**
- **Intuition deals with the Amiga's mouse, windows and so on.**
- **B was the predecessor to C.**

Thanks to all who entered, but sadly only five people can win. Those lucky folks are: J Montero of World's End Estate in London, Daniel Whitelaw of Stourbridge in the West Midlands, Kow Evans of Christchurch in Dorset, WG Anderson of Bearsden in Glasgow and Len Richards of Porthcawl in South Wales. Congratulations all; your prizes of six *Mastering Amiga* books are on their way.

IN NEXT MONTH'S ISSUE

- Ray tracing – Jason Holborn explains how to get the best out of 3D scene creators and takes a look at the wealth of packages available, from PD to professional.
- Stand by for blast off! Accelerators come under the *Amiga Shopper* microscope. Toby Simpson is the man who tells you which product gives the biggest bang for your bucks.
- Part two of our new C series – compiling your first program and sending output to the screen.
- More on multitasking. *AS* does it all, all at once!

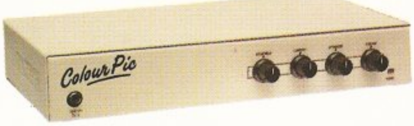
Plus regular columns on Amiga Answers, video, AmigaDOS, desktop publishing and much more

On sale Thursday, November 5



ColourPic

NEW !



ColourPic is JCL's best selling video digitiser. Grabbing frames from a live video source in 64,000 vibrant colours is simplicity itself. If you have struggled with a colour wheel or splitter and have had to limit your video digitising to static objects or just monochrome, you will find ColourPic pure joy. ColourPic has its own built-in 64,000 colour framestore which is constantly digitising the incoming picture in REAL-TIME. Just press a key to freeze the picture and import it into the Amiga. It couldn't be easier!

NEW! ColourPic has been upgraded to include a S-VHS (Y-C) input and is now shipped with 'Cabaret' our comprehensive 24-bit image processing software in addition to the standard ColourPic software.

* **ColourPic can capture lo-res, interlace or hi-res images and convert them to HAM, 32 colour, 16 colour and monochrome IFF files.**
* **ColourPic has RGB, composite and UHF TV outputs from its framestore to drive a second monitor.**
* **ColourPic works with all Amiga computers, even the A500P.**
* **ColourPic can be upgraded to ColourPic AniMate.**
* **ColourPic has comprehensive monochrome image processing tools.**
* **ColourPic is shipped with Cabaret 24-bit image processing software.**

ColourPic RRP £499 inc VAT
ColourPic AniMate RRP £599 inc VAT

SuperPic



SuperPic is a framegrabber and genlock in one box! It is the perfect answer to anyone who needs all the facilities of real-time colour video digitising and the ability to combine computer generated graphics with a video source. SuperPic has a built-in 64,000 colour framestore which is constantly digitising the incoming video source in real-time. Just press a key to freeze the picture and import it into the Amiga. It just couldn't be easier! The genlock built in to SuperPic has an RGB output for the finest possible results in addition to composite output and provides the Amiga user with a very stable product, ideal for titling.

NEW! SuperPic is now shipped with 'Cabaret' our comprehensive 24-bit image processing software in addition to the standard SuperPic software and a three button optical mouse with mat.

* **SuperPic can capture lo-res, interlace or hi-res images and convert them to HAM, 32 colour, 16 colour and monochrome IFF files.**
* **SuperPic can be upgraded to SuperPic AniMate.**
* **SuperPic has it's own built-in genlock for combining computer generated graphics with a video picture – ideal for titling.**
* **SuperPic allows you to switch between Amiga display, framestore and video outputs on your standard RGB monitor at the touch of a button.**
* **SuperPic is shipped with Cabaret 24-bit image processing software.**

SuperPic RRP £599 inc VAT
SuperPic Animate RRP £699 inc VAT

ColourPic Plus

NEW !



ColourPic Plus, JCL's latest addition to their Amiga real-time colour video digitiser range, brings you the most powerful digitiser available to the Amiga user in its price range. A professional machine engineered to the highest standards and using the latest technology, ColourPic Plus combines all the features present in ColourPic with AniMate as standard and an impressive number of new features and new software.

The Impossible? – ColourPic Plus can do it!

Combine a framestore picture in 64,000 colours with text on an Amiga database display – without a genlock! With the optional 'Grabit' software from JCL and a prepared database control language module you can add pictures to your personnel file or parts list. Your database pictures could even be animated!

* **ColourPic Plus can capture lo-res, interlace, hi-res or hi-res with interlace images and convert them to HAM, 32 colour, 16 colour and monochrome IFF files.**
* **ColourPic Plus is shipped with 512K RAM and can be upgraded to 1MB for more animation frames and even higher resolution modes.**
* **ColourPic Plus can switch between your Amiga display and the 64,000 colour framestore picture at the press of a key.**
* **ColourPic Plus has S-VHS (Y-C), RGB and composite inputs and provides RGB, composite and UHF TV outputs for an extra monitor if required.**
* **ColourPic Plus is shipped with Cabaret Plus 24-bit image processing software.**

ColourPic Plus RRP £699 inc VAT

AniMate

AniMate, for ColourPic and SuperPic, adds a whole new dimension to video digitising – colour animation. The complete AniMate package upgrades the digitiser to 512K RAM using a special RAM expansion card with time marker control logic and includes control software and manual. AniMate provides a simple and complete method of producing short sequence colour animated images on an Amiga, where the images come from live video such as a camera or a VCR. Simply point a camera at a moving object, select ANIM RECORD/SEQUENCE and press the space bar to capture a series of real life movements.

* **ANIM SET options include frame delay and first field hold off.**
* **ANIM RECORD options include sequence record and single step record.**
* **Select ANIM PLAY/CYCLE and the recorded sequence is repeated.**
* **ANIM PLAY options include sequence, single step, mouse scroll, cycle and ping-pong.**
* **Sequences recorded from a VCR may be joined together to produce ANIM files.**
* **The interval between recorded fields can be set at any number of fields.**
* **The individual fields of an animation may be examined by using the up/down movement of a joystick.**
* **Fields from an animation sequence may be converted to standard Amiga IFF format and then built into an ANIM format file for replay.**

Upgrade your ColourPic or SuperPic for £150 inc VAT

Cabaret

CABARET the image processing package shipped with ColourPic and SuperPic provides image import facilities together with colour and monochrome image processing functions to modify existing pictures. Cabaret has a wide range of filter and masking options to enhance pictures and produce interesting effects.

* **Cabaret will import and display HAM, EHB, 32, 16, 8 and 4 colour pictures plus Monochrome and Threshold images in normal and overscan modes.**
* **Cabaret will SAVE and LOAD images in standard IFF format, plus a wide range of other formats including TARGA and AIM.**
* **Cabaret will produce X & Y flips, mirror images, multiple images, magnified parts of an image and control colour balance, contrast and brightness.**
* **Cabaret works on all Amigas with 1 MByte or more of memory.**

CABARET PLUS software, which needs 3 MByte of memory to make full use of all facilities, has all the features of Cabaret – **PLUS**

* **Extra filters including Uniform, Kuwahara, Posterize, Median and Gamma.**
* **New features including Emboss, Dropshadow and Combine.**
* **Interlace and hi-res modes AND Save in 24-bit IFF!**

For the user with less than 3 MByte of memory the Cabaret functions may be used without the 'Plus' features.

Cabaret RRP £29.95 inc VAT Cabaret Plus RRP £89.95 inc VAT

ColourPic, SuperPic and ColourPic Plus are available from selected dealers or direct from JCL.

** GOLD DEALERS AND STOCKISTS!! **

Trilogic
253 New Works Road
Low Moor
Bradford
BD12 0QP
Tel: 0274 691115

Computer Care South Ltd
499 Oxford Road
Reading
Berks
RG3 1HQ
Tel: 0734 393615

Gordon Harwood Computers
New Street
Alfreton
Derbyshire
DE5 7BP
Tel: 0773 836781

Ultima
First Floor
White Lion Walk
Guildford
Surrey, GU1 3DW
Tel: 0483 506939

Videoquip
5 Fosse Road South
Leicester
LE3 0LP
Tel: 0533 558818

Silica Systems
1–4 The Mews
Hatherley Road
Sidcup
Kent, DA14 4DX
Tel: 081 302 8811

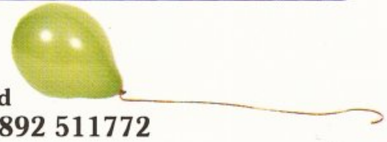
About our framestore. . .

All of JCL's video digitisers can grab a frame from a live video source in 1/25th of a second using a 64,000 colour framestore which is constantly digitising the incoming picture in real-time. The framestore displays a picture of such high quality that you may suspect you are looking at a straight through connection from the video input, but don't be deceived, this is a digital picture, just press the Z key to see it freeze!

The framestore's 64,000 colour palette can be used to display previously digitised images stored on a disk as well as show Sculpt (and other) images in a much wider range of colours than the Amiga's HAM mode. The effect is stunning!

For your free show disk of pictures:-
Contact Carolyn on 0892 518181.

Access VISA EUROCARD



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LC 24-20 Mono	24	360	230/75	10	16	80	£209.99
LC 24-200 Mono	24	360	220/55	10	7	80	£229.99
LC 24-200 Colour	24	360	220/55	10	30	80	£269.99
XB 24-200 Col[◆]	24	360	275/80	18	29	80	£379.99
XB 24-250 Col[◆]	24	360	275/80	18	76	136	£454.99

CITIZEN DOT MATRIX PRINTERS

	No. Pins	DPI	SPEED Draft/NLQ	No. Fonts	Buffer	Columns	
120D+ Mono	9	240	120/25	2	4	80	£139.99
SWIFT 9 Mono	9	240	160/40	4	8	80	£184.99
SWIFT 9 Colour	9	240	160/40	4	8	80	£194.99
224 Mono	24	360	160/53	4	8	80	£219.99
224 Colour	24	360	160/53	4	8	80	£229.99
SWIFT 24E Mono	24	360	180/60	7	8	80	£269.99
SWIFT 24E Colour	24	360	180/60	7	8	80	£279.99

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Postscript compatible laser printer...Brilliant Quality Print!

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STAR	Star LC 24/200	£6.99	£32.99	£12.99	£59.95
STAR	Star XB Printers	£6.99	£32.99	£12.99	£59.95
CITIZEN	120D+/Swift9	£4.99	£22.95	-	-
CITIZEN	124D/Swift24	£4.99	£22.95	-	-
CITIZEN	Swift9/24/224/24E	-	-	£16.45	£76.95

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Font Cards	N/A	£27.99	£54.99	£27.99

CITIZEN	
120D+ Cut Sheet Feeder	£74.99
124D, Swift 9/24 Semi-auto Sht.Feeder	£44.99
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Please state printer model when ordering

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NOTE! the above prices are based on purchasing WITH an Amiga

CITIZEN NEW RANGE

At the time of going to press Citizen announced a new printer range. Prices are yet be confirmed but the specifications are *expected* to be as follows...

Citizen 240 - Mono...
24 Pin, 80 Column, 200cps Draft, 66cps LQ, Colour Kit optional, 9 LQ Fonts, 2 Scaleable Fonts, 8K Buffer

Citizen 240C - Colour...
As above but with colour kit option included.

Citizen 200 - Mono...
24 Pin, 80 Column, 180cps Draft, 60cps LQ, Colour Kit optional, 6 LQ Fonts, 8K Buffer

Please phone for further details and full confirmation

PHILIPS CM8833/II COLOUR MONITOR

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With 12mths. on site maintenance

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- CM8833 MkII — £14.95

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PHILIPS 2341 - 17" version of the 2331 with Teletext	£319.99

Take £10 off if bought with other Hardware



DELIVERY

Small items are despatched by post to all UK Mainland addresses for a nominal fee, unless otherwise discussed. Hardware is despatched by courier service (up to 25Kg) as follows: NEXT WORKING DAY... add £7.50 to order, TWO WORKING DAYS...add £6, or for SPECIAL SATURDAY DELIVERY...add just £12. (Please note courier service applies to MOST UK Mainland addresses).

WARRANTY

Hardware proving faulty within 30 days will be exchanged for NEW (subject to condition etc). After 30 days and within 12 months from purchase, faults will be rectified by the relevant manufacturers' repair agent and returned to you by courier. Software and small items carry various warranties, just ask for details.

BFPO & EXPORT

Merlin are happy to supply BFPO and export markets for which VAT is normally deductible. Delivery charges vary from UK rates and, as products carry UK warranties only, faulty items are to be returned to Merlin by customers & re-delivery charges will apply.

PLEASE NOTE...

Whilst every effort is made to ensure information in this advert is correct, you should always confirm any offers, prices, availability etc. prior to placing your order. We endeavour to supply goods as shown and will ONLY change details should it be made necessary by our suppliers etc. As our advertising is booked so far in advance Merlin therefore reserve the right to alter product specs, with-draw any product/offer/service or update prices (and that can be up OR down), without prior notice. Merlin guarantee never to supply anything that has been subject to change without you, the customer, being informed of and agreeing to that change. Please ALWAYS confirm details PRIOR to placing your order. All our currently advertised offers supercede previously advertised offers and goods are NOT supplied on a trial basis. E&OE

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